OUR COUNTRY'S SHELLS

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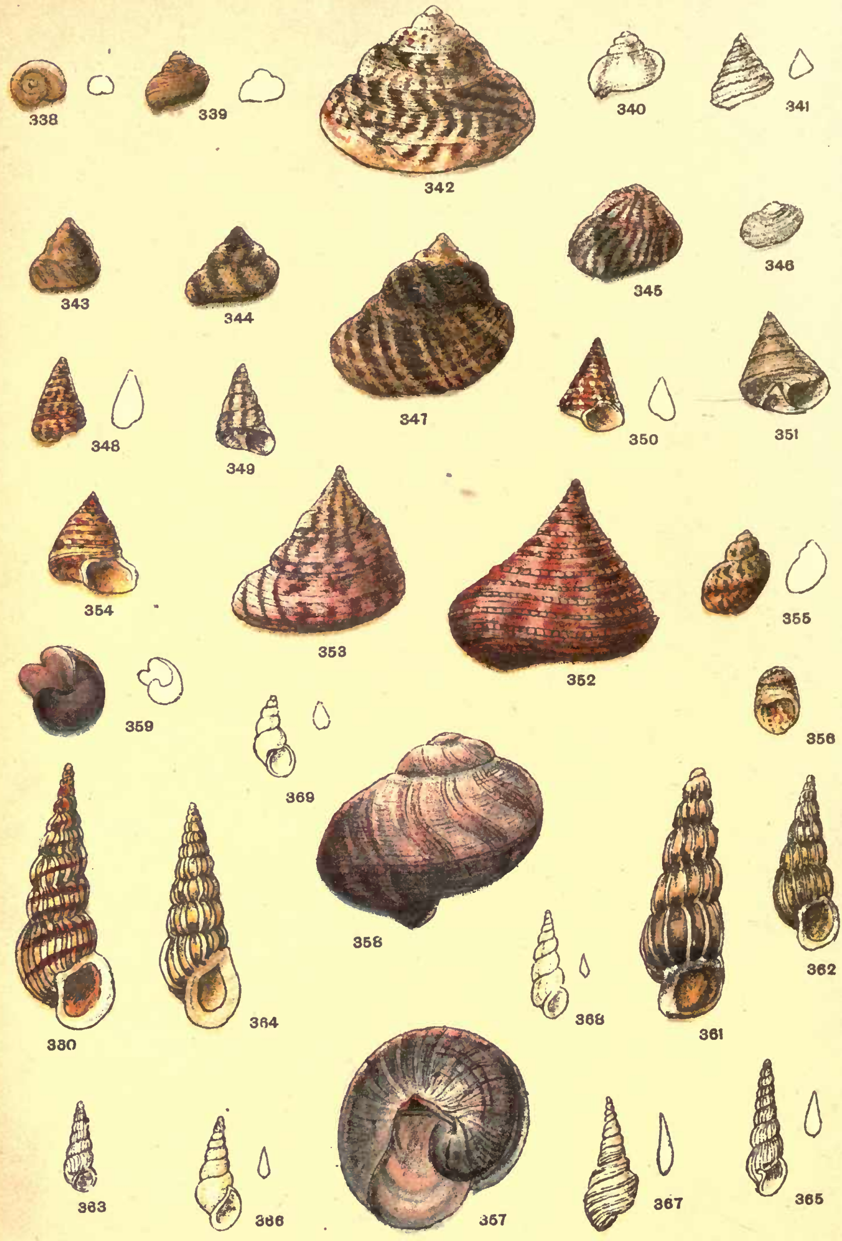
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OUR COUNTRY'S SHELLS

AND

HOW TO KNOW THEM.

A Guide to the British Mollusca.

BY

W. J. GORDON,

AUTHOR OF "OUR COUNTRY'S FLOWERS," "OUR COUNTRY'S BIRDS,"
"OUR COUNTRY'S BUTTERFLIES AND MOTHS,"
ETC.

WITH A COLOURED ILLUSTRATION OF EVERY SPECIES,
AND MANY ORIGINAL DIAGRAMS,
BY
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OUR COUNTRY'S SHELLS and How to Know Them. A Guide to the British Mollusca.

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INTRODUCTION.

THIS book, like the rest of the series, is intended as an introductory working manual for the collector, the object of its analytical tables being to enable him to name any specimen in the British list without reading more than is needful for that one purpose. It is on the same principle as its predecessors. In the Flowers we dealt with a natural kingdom; in the Birds with a natural class, in the Butterflies and Moths with a natural order; in this volume we are dealing with a natural sub-kingdom, so that we have had an example of each of the four highest systematic groups treated on the same plan.

Every living species of the sub-kingdom generally claimed as a native of our country is here sufficiently described to distinguish it from the rest, whether it has a shell or not; thus rather a wider range is covered than the main title would indicate, as many of the mollusca do not have shells. The coloured plates include all the species having shells, and these are drawn the size of life or enlarged in the case of those too small to be clearly shown and then their natural dimensions are given alongside.

Of those without shells a representative of each genus is figured. The sea-slugs are given in colour, and are either of the natural size or enlarged. The cuttle-fishes are illustrated in two full-page plates, but it need hardly be said have had to be reduced; indeed it would have been difficult to draw them to full scale, particularly if we had followed the lead of one enthusiast and included *Architeuthis* among the British genera, on the strength of the specimen captured off the Irish coast which had tentacles thirty feet long, mandibles four inches across, and eyes fifteen inches in diameter.

There is no species of the mollusca solely British except perhaps *Limnæa involuta*, which comes from a pool on the Cromagaun mountain, near Killarney, and is consequently Irish; but even this is regarded by some as a variety. The other land species occur

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throughout Northern Europe and Asia, and the sea species on almost every coast of the North Sea and along the eastern half of the North Atlantic. Some are found much further away. *Ianthina*, the most beautiful of our univalves, comes drifting to us across the wide ocean, and is known all the way from Patagonia.

A mollusc is British if it has been dredged up in British seas or found alive in any part of the British Isles. Thus a good wide net is spread for stragglers, and nationality seems to have been occasionally determined by the arrival of an individual in a gale of wind. This is inevitable, but it should be remembered that most of the mollusca are diœcious, though some are monœcious, and among the bivalves the same genus may have the sexes of its species distinct or combined. For instance, the British oyster is monœcious, but the American oyster is diœcious, and when transplanted to this country has to have both sexes brought across the Atlantic.

This oyster is one of several cases of successful acclimatisation, though mollusca are not so easily settled in strange lands as might be supposed. The fact that nineteen of our land shells have taken up their abode in Australia merely shows that a few species are capable of thriving almost anywhere. There are British snails in most ports frequented by British ships; they travel in the packages and packing materials. Foreigners evidently come here in a similar way, and some of our novelties are traceable to nursery gardens, to which they have been imported in the mould around the roots of the plants. But no matter how they came or how widely they may be distributed over the world, they are British if they are found here, and thus our country's mollusca number over 700 species, with perhaps three times as many varieties.

W. J. G.

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CHAPTER I.

LOCAL AND POPULAR NAMES.

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Fusus antiquus.

Bearded Mussel, 21.
Mytilus barbatus.

Black Mussel, The, 55.
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Black Slug, 241.
Arion ater.

Bonnet Limpet, 383.
Calyptræa chinensis.

Bonnet, Torbay, 382.
Capulus hungaricus.

Brown Slug, 236.
Limax lævis.

Bubble Shell, 227-229, 565-567.
Physa (the genus) and Bulla (the genus).

Buckie, 520.
Fusus antiquus.

Capped Cyclas, 82.
Sphærium lacustre.

Cheese Snail, 277.
Helix obvoluta.

Chrysalis Snail, 288-291.
Pupa (the genus).

Clam, 143.
Mya arenaria.

Cockle, 136.
Cardium edule.

Cockle, Brillion, 143.
Mya arenaria.

Coil Snail, 215-226.
Planorbis (the genus).

Cowry, 457.
Cypræa europæa.

Cup-and-Saucer Limpet, 383.
Calyptræa chinensis.

Cyclas, Capped, 82.
Sphærium lacustre.

Cyclas, Horny, 81.
Sphærium corneum.

Cyclas, Oval, 83.
Sphærium ovale.

Cyclas, River, 84.
Sphærium rivicola.

Dog Cockle, The, 16.
Pectunculus glycimeris.

Dog Periwinkle, 344, 508.
Trochus cinerarius and Purpura lapillus.

Dog-Whelk, 513-516.
Nassa (the genus).

Dove Shell, 511, 512.
Columbella (the genus).

Ear Shell, 333.
Haliotis tuberculata

Eight-Whorled Mud Shell, 208.
Limnæa glabra.

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Limax agrestis.

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Ancylus (the genus).

Gaper, 143-148.
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Arion hortensis.

Garden Snail, 273
Helix hortensis.

Garlic Snail, 249.
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Glass Snail, 247.
Vitrina pellucida.

Gowrie, 457.
Cypræa europæa.

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Helix revelata.

Heart-Cockle, 54.
Isocardia cor.

Horny Cyclas, 81.
Sphærium corneum.

Horse Mussel, 20.
Mytilus modiolus.

Irish Slug, 246.
Geomalacus maculosus.

Keeled Slug, 233.
Amalia marginata.

Kentish Snail, 266.
Helix cantiana.

Keyhole Limpet, 326-328.
Fissurella (the genus) and Puncturella (the genus).

Land Sole, 241.
Arion ater.

Limpet, 324.
Patella vulgata.

Limpet, Bonnet, 383.
Calyptræa chinensis.

Limpet, Cup-and-Saucer, 383.
Calyptræa chinensis.

Limpet, Fresh-water, 205, 206.
Ancylus (the genus).

Limpet, Keyhole, 326-328.
Fissurella (the genus) and Puncturella (the genus).

Limpet, Rock, 324.
Patella vulgata.

Looping Snail, 399.
Truncatella truncatula.

Marsh Shell, 440.
Viviparus vivipara.

Milky Slug, 235.
Limax agrestis.

Mussel, 19-23.
Mytilus (the genus).

Mussel, Black, 55.
Unio margaritifer.

Mussel, Painters', 56.
Unio pictorum.

Mussel, Pearl, 55.
Unio margaritifer.

Mussel, Swan, 59.
Anodonta cygnea

Mussel, Swollen Fresh-water, 57.
Unio tumidus.

Mussel, Zebra, 60.
Dreissensia polymorpha.

Notched Limpet, 329.
Emarginula fissura.

Nut Shell, 1-4.
Nucula (the genus).

Old Maid, 143.
Mya arenaria.

Ormer, 333.
Haliotis tuberculata.

Otter Shell, 147, 148.
Lutraria (the genus).

Oval Cyclas, 83.
Sphærium ovale.

Oyster, 32.
Ostrea edulis.

Painters' Mussel, 56.
Unio pictorum.

Papier Mache Shell, 333.
Haliotis tuberculata.

Pearl Mussel, The, 55.
Unio margaritifer.

Pelican's Foot, 455.
Aporrhais pes-pelecani.

Perforated Limpet, 328.
Puncturella noachina.

Periwinkle, 387-391.
Littorina (the genus).

Periwinkle, Dog, 344, 508.
Purpura lapillus, and Trochus cinerarius.

Pheasant Shell, 355.
Phasianella pulla.

Piddock, 160-163.
Pholas (the genus).

Pigmy Cockle, 133.
Cardium exiguum.

Pinpatch, 390.
Littorina littorea.

Pond Snail, 207-214.
Limnæa (the genus).

Razor Fish, 152-155
Solen (the genus).

Razor Shell, 149-155.
Solecurtus (the genus), Ceratisolen (the genus), and Solen (the genus).

Red Whelk, 520.
Fusus antiquus.

River Cyclas, 84.
Sphærium rivicola.

River Limpet, 206.
Ancylus fluviatilis.

Rock Limpet, 324.
Patella vulgata.

Scallop, 43.
Pecten maximus.

Sea Hare, 577-579.
Aplysia (the genus).

Sea Lemon, 662-683.
Doris (the genus).

Shining Pisidium, 87.
Pisidium nitidum.

Shipworm, 166-171.
Teredo (the genus).

Six-toothed Whorl Shell, 301.
Vertigo substriata.

Sliggaun, 59.
Anodonta cygnea.

Spindle Shell, 520.
Fusus antiquus.

Spout Shell, 455.
Aporrhais pes-pelecani.

Sting Winkle, 506.
Murex erinaceus.

Striped Sunset, The, 141.
Psammobia ferroensis

Sunset Shell, 139-142.
Psammobia (the genus).

Swan Mussel, 59.
Anodonta cygnea.

Swollen Fresh-water Mussel, 57.
Unio tumidus.

Tellen, 90-97.
Tellina (the genus).

Tender Slug, 237.
Limax tenellus.

Tooth Shell, 184-189.
Siphonodentalium (the genus), Cadulus (the genus), and Dentalium (the genus).

Torbay Bonnet, 382.
Capulus hungaricus

Vine Snail, 279.
Helix pomatia.

Violet Sea-Snail, 357-359.
Ianthina (the genus).

Wedge Shell, 104-106.
Donax (the genus).

Wentletrap, 360-364.
Scalaria (the genus).

Whelk, 517, 518, 520.
Buccinum (the genus) and Fusus antiquus.

Whelk, Red, 520.
Fusus antiquus.

White Snail, 280.
Helix pulchella.

Whorl Snail, 292-302.
Vertigo (the genus).

Wood Snail, 276.
Helix nemoralis.

Wrinkled Snail, 267.
Helix caperata.

Yellow Slug, 234.
Limax flavus.

Zebra Mussel, 60.
Dreissensia polymorpha.

CHAPTER II.

THE COLOURED PLATES.

THE numbers inset are those of the land and fresh-water species. The bringing of the bivalves to the front and putting the pulmonates immediately after the chitons is not an attempt at a new classification. It is simply the arrangement which was eventually found convenient for the grouping of the illustrations.

PELECYPODA.

PROTOBRANCHIATA.

NUCULIDÆ.

Plate I.

1. NUCULA SULCATA.
2. NUCULA NUCLEUS.
3. NUCULA NITIDA.
4. NUCULA TENUIS.
5. LEDA PYGMÆA.
6. LEDA LUCIDA.
7. LEDA MINUTA.
8. LEDA PERNULA.

FILIBRANCHIATA.

ANOMIACEA.

ANOMIIDÆ.

9. ANOMIA EPHIPPIUM.
10. ANOMIA PATELLIFORMIS.

ARCACEA.

ARCADÆ.

11. ARCA PECTUNCULOIDES.
12. ARCA OBLIQUA.
13. ARCA LACTEA.
14. ARCA TETRAGONA.
15. ARCA NODULOSA.
16. PECTUNCULUS GLYCIMERIS.
17. LIMOPSIS AURITA.
18. LIMOPSIS BOREALIS.

MYTILACEA.

MYTILIDÆ.

Plate II. 19. MYTILUS EDULIS.
20. MYTILUS MODIOLUS.
21. MYTILUS BARBATUS.
22. MYTILUS ADRIATICUS.
23. MYTILUS PHASEOLINUS.
24. CRENELLA RHOMBEA.
25. CRENELLA DECUSSATA.
26. MODIOLARIA MARMORATA.
27. MODIOLARIA COSTULATA.
28. MODIOLARIA DISCORS.
29. MODIOLARIA NIGRA.

PSEUDOLAMELLIBRANCHIATA.

AVICULIDÆ.

Plate III. 30. AVICULA HIRUNDO.
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OSTREIDÆ.

32. OSTREA EDULIS.

PECTINIDÆ.

33. PECTEN PUSIO.
34. PECTEN VARIUS.
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37. PECTEN TIGRINUS.
38. PECTEN TESTÆ.
39. PECTEN STRIATUS.
40. PECTEN SIMILIS.
41. PECTEN ARATUS.
42. PECTEN VITREUS.
43. PECTEN MAXIMUS.

LIMIDÆ.

Plate V. 44. LIMA SARSII.
45. LIMA ELLIPTICA.
46. LIMA SUB-AURICULATA.
47. LIMA LOSCOMBII.
48. LIMA HIANS.

EULAMELLIBRANCHIATA.

SUBMYTILACEA.

CARDITIDÆ.

49. CYAMIUM MINUTUM.

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ASTARTIDÆ.

50. ASTARTE SULCATA.
51. ASTARTE COMPRESSA.
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CYPRINIDÆ.

53. CYPRINA ISLANDICA.
54. ISOCARDIA COR.

UNIONIDÆ.

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56. UNIO PICTORUM.
57. UNIO TUMIDUS.
58. ANODONTA ANATINA.
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DREISSENSIIDÆ.

60. DREISSENSIA POLYMORPHA.

LUCINIDÆ.

61. LUCINA SPINIFER.
62. LUCINA BOREALIS.
63. LORIPES LACTEUS.
64. LORIPES DIVARICATUS.
65. DIPLODONTA ROTUNDATA.
66. AXINUS FLEXUOSUS.
67. AXINUS CROULINENSIS.
68. AXINUS FERRUGINOSUS.
69. MONTACUTA SUBSTRIATA.
70. MONTACUTA BIDENTATA.
71. MONTACUTA TUMIDULA.
72. MONTACUTA FERRUGINOSA.

ERYCINIDÆ.

73. KELLIA SUBORBICULARIS.
74. KELLIA CYCLADIA.
75. LASÆA RUBRA.
76. LEPTON SQUAMOSUM.
77. LEPTON NITIDUM.
78. LEPTON SULCATULUM.
79. LEPTON CLARKIÆ.

GALEOMMIDÆ.

80. GALEOMMA TURTONI.

CYRÆNIDÆ.

81. SPHÆRIUM CORNEUM.
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87. PISIDIUM NITIDUM.
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TELLINIDÆ.

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97. TELLINA PUSILLA.
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SCROBICULARIIDÆ.

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100. SCROBICULARIA NITIDA.
101. SCROBICULARIA ALBA.
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VENERACEA.

VENERIDÆ.

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126. TAPES DECUSSATUS.
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PETRICOLIDÆ.

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CARDIACEA.

CARDIIDÆ.

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134. CARDIUM FASCIATUM.
135. CARDIUM NODOSUM.
136. CARDIUM EDULE.
137. CARDIUM MINIMUM.
138. CARDIUM NORVEGICUM.

MYACEA.

PSAMMOBIIDÆ.

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142. PSAMMOBIA VESPERTINA.

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144. MYA TRUNCATA.
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GASTROCHŒNIDÆ.

159. GASTROCHŒNA DUBIA.

PHOLADACEA.

PHOLADIDÆ.

160. PHOLAS DACTYLUS.
161. PHOLAS CANDIDA.
162. PHOLAS PARVA.
163. PHOLAS CRISPATA.
164. PHOLADIDEA PAPYRACEA.
165. XYLOPHAGA DORSALIS.

TEREDINIDÆ.

166. TEREDO NORVEGICA.
167. TEREDO NAVALIS.
168. TEREDO PEDICELLATA.
169. TEREDO MEGOTARA.
170. TEREDO MALLEOLUS.
171. TEREDO BIPINNATA.

ANATINACEA.

PANDORIDÆ.

Plate XV.

172. PANDORA INÆQUIVALVIS.

LYONSIIDÆ.

173. LYONSIA NORVEGICA.

ANATINIDÆ.

174. THRACIA PRÆTENUIS.
175. THRACIA PAPYRACEA.
176. THRACIA PUBESCENS.
177. THRACIA CONVEXA.
178. THRACIA DISTORTA.

SEPTIBRANCHIATA.

POROMYIDÆ.

179. POROMYA GRANULATA.
180. NEÆRA ABBREVIATA.
181. NEÆRA COSTELLATA.
182. NEÆRA ROSTRATA.
183. NEÆRA CUSPIDATA.

PLATE XV. (*continued*)—

SCAPHOPODA.

DENTALIIDÆ.

184. SIPHONODENTALIUM LOFOTENSE.
185. CADULUS SUBFUSIFORMIS.
186. CADULUS JEFFREYSII.
187. DENTALIUM ENTALIS.
188. DENTALIUM TARENTINUM.
189. DENTALIUM ABYSSORUM.

GASTROPODA.

AMPHINEURA.

POLYPLACOPHORA.

CHITONIDÆ.

Plate XVI.

190. CHITON FASCICULARIS.
191. CHITON DISCREPANS.
192. CHITON HANLEYI.
193. CHITON CANCELLATUS.
194. CHITON CINEREUS.
195. CHITON ALBUS.
196. CHITON MARGINATUS.
197. CHITON RUBER.
198. CHITON LÆVIS.
199. CHITON MARMOREUS.
200. CHITON SCABRIDUS.

PULMONATA.

BASOMMATOPHORA.

AURICULIDÆ.

Plate XVII.

201. CARYCHIUM MINIMUM
202. MELAMPUS BIDENTATUS.
203. MELAMPUS MYOSOTIS.

OTINIDÆ.

204. OTINA OTIS.

LIMNÆIDÆ.

205. ANCYLUS LACUSTRIS.
206. ANCYLUS FLUVIATILIS.
207. LIMNÆA AURICULARIA.
208, LIMNÆA GLABRA.
209. LIMNÆA GLUTINOSA.

PLATE XVII. (*continued*)—

210. LIMNÆA INVOLUTA.
211. LIMNÆA PALUSTRIS.
212. LIMNÆA PEREGRA.
213. LIMNÆA STAGNALIS.
214. LIMNÆA TRUNCATULA.
215. PLANORBIS ALBUS.
216. PLANORBIS CARINATUS.
217. PLANORBIS COMPLANATUS.
218. PLANORBIS CONTORTUS.
219. PLANORBIS CORNEUS.
220. PLANORBIS DILATATUS.
221. PLANORBIS GLABER.
222. PLANORBIS LINEATUS.
223. PLANORBIS NAUTILEUS.
224. PLANORBIS NITIDUS.
225. PLANORBIS SPIRORBIS.
226. PLANORBIS VORTEX.

PHYSIDÆ.

227 PHYSA ACUTA.
228. PHYSA FONTINALIS.
229. PHYSA HYPNORUM.

STYLOMMATOPHORA.

TESTACELLIDÆ.

Plate XVIII. 230. TESTACELLA HALIOTIDEA.
231. TESTACELLA MAUGEI.

LIMACIDÆ.

232. AMALIA GAGATES.
233. AMALIA MARGINATA.
234. LIMAX FLAVUS.
235. LIMAX AGRESTIS.
236. LIMAX LÆVIS.
237. LIMAX TENELLUS.
238. LIMAX ARBORUM.
239. LIMAX MAXIMUS.
240. LIMAX CINEREO-NIGER.
241. ARION ATER.
242. ARION BOURGUIGNATI.
243. ARION FLAVUS.
244. ARION HORTENSIS.
245. ARION SUBFUSCUS.
246. GEOMALACUS MACULOSUS.

HELICIDÆ.

Plate XIX. 247. VITRINA PELLUCIDA.
248. ZONITES DRAPARNALDI.

PLATE XIX. (*continued*)—

249. ZONITES ALLIARIUS.
250. ZONITES CELLARIUS.
251. ZONITES CRYSTALLINUS.
252. ZONITES EXCAVATUS.
253. ZONITES FULVUS.
254. ZONITES GLABER.
255. ZONITES NITIDUS.
256. ZONITES NITIDULUS.
257. ZONITES PURUS.
258. ZONITES RADIATULUS.
259. BULIMUS ACUTUS.
260. BULIMUS GOODALLII.
261. BULIMUS MONTANUS.
262. BULIMUS OBSCURUS.
263. HELIX ACULEATA.
264. HELIX ARBUSTORUM.
265. HELIX ASPERSA.
266. HELIX CANTIANA.
267. HELIX CAPERATA.
268. HELIX CARTUSIANA.
269. HELIX CONCINNA.
270. HELIX ERICETORUM.
271. HELIX FUSCA.
272. HELIX HISPIDA.
273. HELIX HORTENSIS.
274. HELIX LAMELLATA.
275. HELIX LAPICIDA.
276. HELIX NEMORALIS.
277. HELIX OBVOLUTA.
278. HELIX PISANA.

Plate XX.

279. HELIX POMATIA.
280. HELIX PULCHELLA.
281. HELIX PYGMÆA.
282. HELIX REVELATA.
283. HELIX ROTUNDATA.
284. HELIX RUFESCENS.
285. HELIX RUPESTRIS.
286. HELIX SERICEA.
287. HELIX VIRGATA.

PUPIDÆ.

288. PUPA MARGINATA.
289. PUPA RINGENS.
290. PUPA SECALE.
291. PUPA UMBILICATA.
292. VERTIGO ALPESTRIS.
293. VERTIGO ANGUSTIOR.
294. VERTIGO ANTIVERTIGO.

PLATE XX. *(continued)*—

295. VERTIGO EDENTULA.
296. VERTIGO LILLJEBORGII.
297. VERTIGO MINUTISSIMA.
298. VERTIGO MOULINSIANA.
299. VERTIGO PUSILLA.
300. VERTIGO PYGMÆA.
301. VERTIGO SUBSTRIATA.
302. VERTIGO TUMIDA.
303. BALEA PERVERSA.
304. CLAUSILIA BIPLICATA.
305. CLAUSILIA LAMINATA.
306. CLAUSILIA ROLPHII.
307. CLAUSILIA RUGOSA.
308. CLAUSILIA PARVULA.
309. CLAUSILIA SOLIDA.
310. COCHLICOPA LUBRICA.
311. COCHLICOPA TRIDENS.

STENOGYRIDÆ.

312. ACHATINA ACICULA.

SUCCINEIDÆ.

313. SUCCINEA ELEGANS.
314. SUCCINEA OBLONGA.
315. SUCCINEA PFEIFFERI.
316. SUCCINEA PUTRIS.
317. SUCCINEA VIRESCENS.

ONCHIDIIDÆ.

318. ONCHIDIUM CELTICUM.

PROSOBRANCHIATA.

DIOTOCARDIA.

DOCOGLOSSA.

ACMÆIDÆ.

Plate XXI.

319. TECTURA TESTUDINALIS.
320. TECTURA VIRGINEA.
321. TECTURA FULVA.

LEPETIDÆ.

322. LEPETA CŒCA.
323. PROPILIDIUM ANCYLOIDES.

PATELLIDÆ.

324. PATELLA VULGATA.
325. HELCION PELLUCIDUM.

PLATE XXI. (*continued*)—

RHIPIDOGLOSSA.

FISSURELLIDÆ.

326. FISSURELLA GRÆCA.
327. FISSURELLA GIBBA.
328. PUNCTURELLA NOACHINA.
329. EMARGINULA FISSURA.
330. EMARGINULA ROSEA.
331. EMARGINULA CRASSA.
332. EMARGINULA CANCELLATA.

HALIOTIDÆ.

333. HALIOTIS TUBERCULATA.

PLEUROTOMARIIDÆ.

334. SCISSURELLA CRISPATA.

CYCLOSTREMATIDÆ.

335. CYCLOSTREMA CUTLERIANUM.
336. CYCLOSTREMA NITENS.
337. CYCLOSTREMA SERPULOIDES.

TROCHIDÆ.

Plate XXII. (Front.) 338. TROCHUS HELICINUS.
339. TROCHUS GRŒNLANDICUS.
340. TROCHUS GLAUCUS.
341. TROCHUS AMABILIS.
342. TROCHUS MAGUS.
343. TROCHUS TUMIDUS.
344. TROCHUS CINERARIUS.
345. TROCHUS UMBILICATUS.
346. TROCHUS DUMINYI.
347. TROCHUS LINEATUS.
348. TROCHUS MONTACUTI.
349. TROCHUS STRIATUS.
350. TROCHUS EXASPERATUS.
351. TROCHUS MILLEGRANUS.
352. TROCHUS GRANULATUS.
353. TROCHUS ZIZYPHINUS.
354. TROCHUS OCCIDENTALIS.

TURBINIDÆ.

355. PHASIANELLA PULLA.

NERITIDÆ.

356. NERITINA FLUVIATILIS.

PLATE XXII. (*continued*)—

MONOTOCARDIA.

PTENOGLOSSA.

IANTHINIDÆ.

357. IANTHINA FRAGILIS.
358. IANTHINA ROTUNDATA
359. IANTHINA EXIGUA.

SCALARIIDÆ.

360. SCALARIA TURTONÆ.
361. SCALARIA COMMUNIS.
362. SCALARIA TREVELYANA.
363. SCALARIA CLATHRATULA.
364. SCALARIA PSEUDOSCALARIS.
365. ACLIS UNICA.
366. ACLIS ASCARIS.
367. ACLIS SUPRANITIDA.
368. ACLIS WALLERI.
369. ACLIS GULSONÆ.

TÆNIOGLOSSA.

NATICIDÆ.

Plate XXIII.

370. NATICA ISLANDICA.
371. NATICA GRŒNLANDICA.
372. NATICA SORDIDA.
373. NATICA CATENA.
374. NATICA ALDERI.
375. NATICA MONTACUTI.
376. NATICA AFFINIS.

LAMELLARIIDÆ.

377. LAMELLARIA PERSPICUA.
378. VELUTINA PLICATILIS.
379. VELUTINA LÆVIGATA.

TRICHOTROPIDÆ.

380. TRICHOTROPIS BOREALIS.
381. TORELLIA VESTITA.

CAPULIDÆ.

382. CAPULUS HUNGARICUS.
383. CALYPTRÆA CHINENSIS.
384. CREPIDULA FORNICATA.

HOMALOGYRIDÆ.

385. HOMALOGYRA ATOMUS.
386. HOMALOGYRA ROTA.

PLATE XXIII. (*continued*)—

LITTORINIDÆ.

387. LITTORINA OBTUSATA.
388. LITTORINA NERITOIDES.
389. LITTORINA RUDIS.
390. LITTORINA LITTOREA.
391. LITTORINA ÆSTUARII.
392. LACUNA CRASSIOR.
393. LACUNA DIVARICATA.
394. LACUNA TENELLA.
395. LACUNA PUTEOLUS.
396. LACUNA PALLIDULA.

CYCLOSTOMATIDÆ.

397. CYCLOSTOMA ELEGANS.

ACICULIDÆ.

398. ACICULA LINEATA.

TRUNCATELLIDÆ.

399. TRUNCATELLA TRUNCATULA.

RISSOIDÆ.

Plate XXIV.

400. RISSOA STRIATULA.
401. RISSOA LACTEA.
402. RISSOA CANCELLATA.
403. RISSOA CALATHUS.
404. RISSOA RETICULATA.
405. RISSOA CIMICOIDES.
406. RISSOA JEFFREYSI.
407. RISSOA PUNCTURA.
408. RISSOA ABYSSICOLA.
409. RISSOA ZETLANDICA.
410. RISSOA COSTATA.
411. RISSOA PARVA.
412. RISSOA INCONSPICUA.
413. RISSOA ALBELLA.
414. RISSOA MEMBRANACEA.
415. RISSOA VIOLACEA.
416. RISSOA COSTULATA.
417. RISSOA STRIATA.
418. RISSOA PROXIMA.
419. RISSOA VITREA.
420. RISSOA PULCHERRIMA.
421. RISSOA FULGIDA.
422. RISSOA SOLUTA.
423. RISSOA SEMISTRIATA.
424. RISSOA CINGILLUS.
425. BARLEEIA RUBRA.

PLATE XXIV. (*continued*)—

HYDROBIIDÆ.

426. HYDROBIA ULVÆ.
427. HYDROBIA SIMILIS.
428. HYDROBIA VENTROSA.
429. HYDROBIA JENKINSII.
430. BITHYNIA LEACHII.
431. BITHYNIA TENTACULATA.

ASSIMINEIDÆ.

432. ASSIMINEA GRAYANA.
433. ASSIMINEA LITTORINA.

SKENEIDÆ.

434. SKENEA PLANORBIS.

JEFFREYSIIDÆ.

435. JEFFREYSIA DIAPHANA.
436. JEFFREYSIA OPALINA.
437. JEFFREYSIA GLOBULARIS.

ADEORBIDÆ.

438. ADEORBIS SUB-CARINATUS.

VIVIPARIDÆ.

439. VIVIPARUS CONTECTA.
440. VIVIPARUS VIVIPARA.

VALVATIDÆ.

441. VALVATA CRISTATA.
442. VALVATA PISCINALIS.

CERITHIIDÆ.

443. CERITHIUM METULA.
444. CERITHIUM RETICULATUM.
445. CERITHIUM PERVERSUM.
446. CERITHIUM VULGATUM.
447. CERITHIOPSIS TUBERCULARIS.
448. CERITHIOPSIS BARLEEI.
449. CERITHIOPSIS PULCHELLA.
450. CERITHIOPSIS METAXA.
451. CERITHIOPSIS COSTULATA.

TURRITELLIDÆ.

Plate XXV.

452. TURRITELLA TEREBRA.

CÆCIDÆ.

453. CÆCUM TRACHEA.
454. CÆCUM GLABRUM.

APORRHAIDÆ.

455. APORRHAIS PES-PELECANI.
456. APORRHAIS MACANDREÆ.

PLATE XXV. (*continued*)—

CYPRÆIDÆ.

457. CYPRÆA EUROPÆA.
458. OVULA PATULA.

TRITONIDÆ.

459. TRITON NODIFERUS.
460. TRITON CUTACEUS.

GYMNOGLOSSA.

EULIMIDÆ.

461. EULIMA POLITA.
462. EULIMA INTERMEDIA.
463. EULIMA DISTORTA.
464. EULIMA STENOSTOMA.
465. EULIMA SUBULATA.
466. EULIMA BILINEATA.
467. STILIFER TURTONI.

PYRAMIDELLIDÆ.

Plate XXVI.

468. ODOSTOMIA MINIMA.
469. ODOSTOMIA NIVOSA.
470. ODOSTOMIA TRUNCATULA.
471. ODOSTOMIA CLAVULA.
472. ODOSTOMIA LUKISI.
473. ODOSTOMIA ALBELLA.
474. ODOSTOMIA RISSOIDES.
475. ODOSTOMIA PALLIDA.
476. ODOSTOMIA CONOIDEA.
477. ODOSTOMIA UMBILICARIS.
478. ODOSTOMIA ACUTA.
479. ODOSTOMIA CONSPICUA.
480. ODOSTOMIA UNIDENTATA.
481. ODOSTOMIA TURRITA.
482. ODOSTOMIA PLICATA.
483. ODOSTOMIA INSCULPTA.
484. ODOSTOMIA DIAPHANA.
485. ODOSTOMIA OBLIQUA.
486. ODOSTOMIA WARRENI.
487. ODOSTOMIA DOLIOFORMIS.
488. ODOSTOMIA DECUSSATA.
489. ODOSTOMIA CLATHRATA.
490. ODOSTOMIA INDISTINCTA.
491. ODOSTOMIA INTERSTINCTA.
492. ODOSTOMIA SPIRALIS.
493. ODOSTOMIA EXIMIA.
494. ODOSTOMIA FENESTRATA.
495. ODOSTOMIA EXCAVATA.
496. ODOSTOMIA SCALARIS.

Plate XXVI. (*continued*)—

497. ODOSTOMIA RUFA.
498. ODOSTOMIA LACTEA.
499. ODOSTOMIA PUSILLA.
500. ODOSTOMIA SCILLÆ.
501. ODOSTOMIA ACICULA.
502. ODOSTOMIA NITIDISSIMA.

RACHIGLOSSA.

MURICIDÆ.

503. TROPHON MURICATUS.
504. TROPHON BARVICENSIS.
505. TROPHON TRUNCATUS.
506. MUREX ERINACEUS.
507. MUREX ACICULATUS.
508. PURPURA LAPILLUS.
509. PURPURA HÆMASTOMIA.
510. LACHESIS MINIMA.

COLUMBELLIDÆ.

511. COLUMBELLA HALIÆETI.
512. COLUMBELLA NANA.

NASSIDÆ.

513. NASSA RETICULATA.
514. NASSA NITIDA.
515. NASSA INCRASSATA.
516. NASSA PYGMÆA.

BUCCINIDÆ.

Plate XXVII. 517. BUCCINUM UNDATUM.
518. BUCCINUM HUMPHREYSIANUM
519. BUCCINOPSIS DALEI.

FASCIOLARIIDÆ.

520. FUSUS ANTIQUUS.
Plate XXVIII. 521. FUSUS NORVEGICUS.
522. FUSUS TURTONI.
523. FUSUS ISLANDICUS.
524. FUSUS GRACILIS.
525. FUSUS PROPINQUUS.
Plate XXIX. 526. FUSUS JEFFREYSIANUS.
527. FUSUS BERNICIENSIS.
528. FUSUS FENESTRATUS.

MARGINELLIDÆ.

529. MARGINELLA LÆVIS.

Plate XXIX. (*continued*)—

TOXOGLOSSA.

CONIDÆ.

530. MANGILIA TERES.
531. MANGILIA GRACILIS.
532. MANGILIA LEUFROYI.
533. MANGILIA LINEARIS.
534. MANGILIA RETICULATA.
535. MANGILIA PURPUREA.
536. PLEUROTOMA STRIOLATA.
537. PLEUROTOMA ATTENUATA.
538. PLEUROTOMA COSTATA.
539. PLEUROTOMA RUGULOSA.
540. PLEUROTOMA BRACHYSTOMA.
541. PLEUROTOMA GALERITA.
542. PLEUROTOMA NEBULA.
543. PLEUROTOMA LÆVIGATA.
544. PLEUROTOMA NIVALIS.
545. PLEUROTOMA CARINATA.
546. PLEUROTOMA SEPTANGULARIS.
547. PLEUROTOMA RUFA.
548. PLEUROTOMA TURRICULA.
549. PLEUROTOMA TREVELYANA.

OPISTHOBRANCHIATA.

TECTIBRANCHIATA.

BULLOIDEA.

ACTÆONIDÆ.

Plate XXX.

550. ACTÆON TORNATILIS.

TORNATINIDÆ.

551. TORNATINUS MAMMILLATUS.
552. TORNATINUS TRUNCATULUS.
553. TORNATINUS OBTUSUS.
554. TORNATINUS VENTROSUS.
555. TORNATINUS EXPANSUS.
556. TORNATINUS HYALINUS.
557. TORNATINUS GLOBOSUS.

SCAPHANDRIDÆ.

558. SCAPHANDER LIGNARIUS.
559. SCAPHANDER LIBRARIUS.
560. CYLICHNA ACUMINATA.
561. CYLICHNA NITIDULA.
562. CYLICHNA UMBILICATA.
563. CYLICHNA CYLINDRACEA.
564. CYLICHNA ALBA.

Plate XXX. (*continued*)—

BULLIDÆ.

565. BULLA HYDATIS.
566. BULLA ELEGANS.
567. BULLA UTRICULUS.
568. ACERA BULLATA.

PHILINIDÆ.

569. PHILINE SCABRA.
570. PHILINE CATENA.
571. PHILINE ANGULATA.
572. PHILINE QUADRATA.
573. PHILINE PUNCTATA.
574. PHILINE PRUINOSA.
575. PHILINE NITIDA.
576. PHILINE APERTA.

APLYSIOIDEA.

APLYSIIDÆ.

577. APLYSIA PUNCTATA.
578. APLYSIA DEPILANS.
579. ALPYSIA MELANOPUS.

PLEUROBRANCHOIDEA.

PLEUROBRANCHIDÆ.

580. PLEUROBRANCHUS MEMBRANACEUS.
581. PLEUROBRANCHUS PLUMULA.

RUNCINIDÆ.

582. RUNCINA HANCOCKI.

PTEROPODA.

THECOSOMATA.

LIMACINIDÆ.

583. SPIRIALIS RETROVERSUS.

CAVOLINIIDÆ.

584. CLIO PYRAMIDATA.

GYMNOSOMATA.

CLIONIDÆ.

585. CLIONE LIMACINA.

ASCOGLOSSA.

HERMÆIDÆ.

Plate XXXI. HERMÆA BIFIDA.

586. HERMÆA DENDRITICA.
587. ALDERIA MODESTA.

PLATE XXXI. (*continued*)—

ELYSIIDÆ.

588. ELYSIA VIRIDIS.

LIMAPONTIIDÆ.

589. LIMAPONTIA NIGRA.
LIMAPONTIA DEPRESSA.
590. ACTÆONIA CORRUGATA.
ACTÆONIA COCKSII.

NUDIBRANCHIATA.

CLADOHEPATICA.

ÆOLIDIDÆ.

ÆOLIS PAPILLOSA.
ÆOLIS GLAUCA.
ÆOLIS ALDERI.
591. ÆOLIS CORONATA.
ÆOLIS DRUMMONDI.
ÆOLIS PUNCTATA.
ÆOLIS ELEGANS.
ÆOLIS RUFIBRANCHIALIS.
ÆOLIS LINEATA.
ÆOLIS GRACILIS.
ÆOLIS SMARAGDINA.
ÆOLIS PELLUCIDA.
ÆOLIS LANDSBURGI.
ÆOLIS ALBA.
ÆOLIS CARNEA.
ÆOLIS GLAUCOIDES.
ÆOLIS PEACHII.
ÆOLIS NANA.
ÆOLIS STIPATA.
ÆOLIS ANGULATA.
ÆOLIS INORNATA.
ÆOLIS CONCINNA
ÆOLIS OLIVACEA.
ÆOLIS AURANTIACA.
ÆOLIS PUSTULATA.
ÆOLIS CONCHII.
ÆOLIS AMŒNA.
ÆOLIS NORTHUMBRICA.
ÆOLIS ARENICOLA.
ÆOLIS GLOTTENSIS.
ÆOLIS CŒRULÆA.
ÆOLIS VIRIDIS.
ÆOLIS PURPURASCENS.
ÆOLIS CINGULATA.

PLATE XXXI. (*continued*)—

ÆOLIS VITTATA.
ÆOLIS PICTA.
ÆOLIS TRICOLOR.
ÆOLIS FARRANI.
ÆOLIS ADELAIDÆ.
ÆOLIS EXIGUA.
ÆOLIS DESPECTA.
ÆOLIS SANGUINEA.
EMBLETONIA PULCHRA.
592. EMBLETONIA MINUTA.
EMBLETONIA PALLIDA.
EMBLETONIA GRAYI.
593. FIONA NOBILIS.
594. PROCTONOTUS MUCRONIFERUS.
595. ANTIOPA CRISTATA.
ANTIOPA HYALINA.
596. HERO FORMOSA.

LOMANOTIDÆ.

Plate XXXII.

597. LOMANOTUS MARMORATUS.
LOMANOTUS FLAVIDUS.
LOMANOTUS PORTLANDICUS.
LOMANOTUS HANCOCKI.

DOTONIDÆ.

DOTO FRAGILIS.
DOTO PINNATIFIDA.
598. DOTO CORONATA.
DOTO CUSPIDATA.

DENDRONOTIDÆ.

599. DENDRONOTUS ARBORESCENS.

SCYLLÆIDÆ.

600. SCYLLÆA PELAGICA.

PLEUROPHYLLIDIIDÆ.

601. PLEUROPHYLLIDIA LOVENI.

TRITONIIDÆ.

602. TRITONIA HOMBERGI.
TRITONIA ALBA.
TRITONIA PLEBEIA.
TRITONIA LINEATA.

HOLOHEPATICA.

DORIDIDÆ.

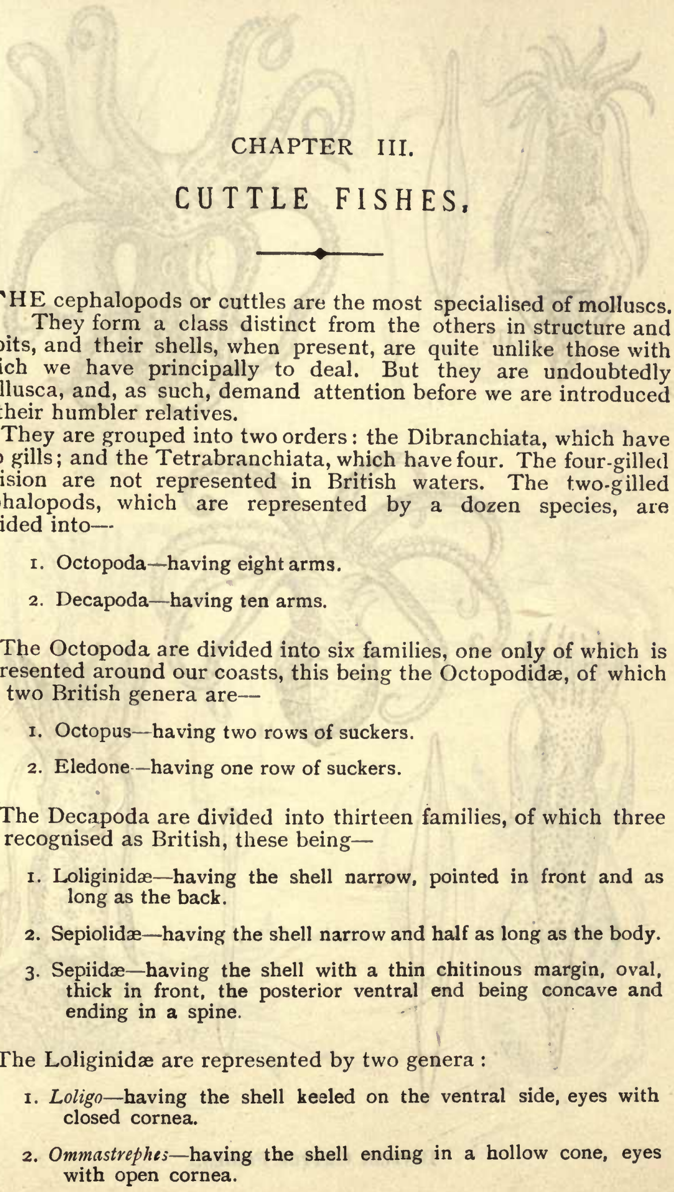
Plate XXXIII. DORIS TUBERCULATA.
DORIS FLAMMEA.
DORIS ZETLANDICA.
DORIS MILLEGRANA.
DORIS TESTUDINARIA.
DORIS JOHNSTONI.
603. DORIS COCCINEA.
DORIS REPANDA.
DORIS ASPERA.
DORIS PROXIMA.
DORIS MURICATA.
DORIS LOVENI.
DORIS ULIDIANA.
DORIS DIAPHANA.
DORIS OBLONGA.
DORIS BILAMELLATA.
DORIS DEPRESSA.
DORIS INCONSPICUA.
DORIS PUSILLA.
DORIS SPARSA.
DORIS PILOSA.
DORIS QUADRANGULATA.

POLYCERIDÆ.

604. POLYCERA QUADRILINEATA.
POLYCERA OCELLATA.
POLYCERA LESSONI.
605. ÆGIRUS PUNCTILUCENS.
606. TRIOPA CLAVIGER.
607. THECACERA PENNIGERA.
THECACERA VIRESCENS.
THECACERA CAPITATA.
608. CRIMORA PAPILLATA.

GONIODORIDÆ.

609. GONIODORIS NODOSA.
GONIODORIS CASTANEA.
610. ANCULA CRISTATA.
611. IDALIA ELEGANS.
IDALIA LEACHII.
IDALIA ASPERSA.
IDALIA INÆQUALIS.
IDALIA PULCHELLA.
IDALIA QUADRICORNIS.



CHAPTER III.

CUTTLE FISHES.

THE cephalopods or cuttles are the most specialised of molluscs. They form a class distinct from the others in structure and habits, and their shells, when present, are quite unlike those with which we have principally to deal. But they are undoubtedly mollusca, and, as such, demand attention before we are introduced to their humbler relatives.

They are grouped into two orders: the Dibranchiata, which have two gills; and the Tetrabranchiata, which have four. The four-gilled division are not represented in British waters. The two-gilled cephalopods, which are represented by a dozen species, are divided into—

1. Octopoda—having eight arms.
2. Decapoda—having ten arms.

The Octopoda are divided into six families, one only of which is represented around our coasts, this being the Octopodidæ, of which the two British genera are—

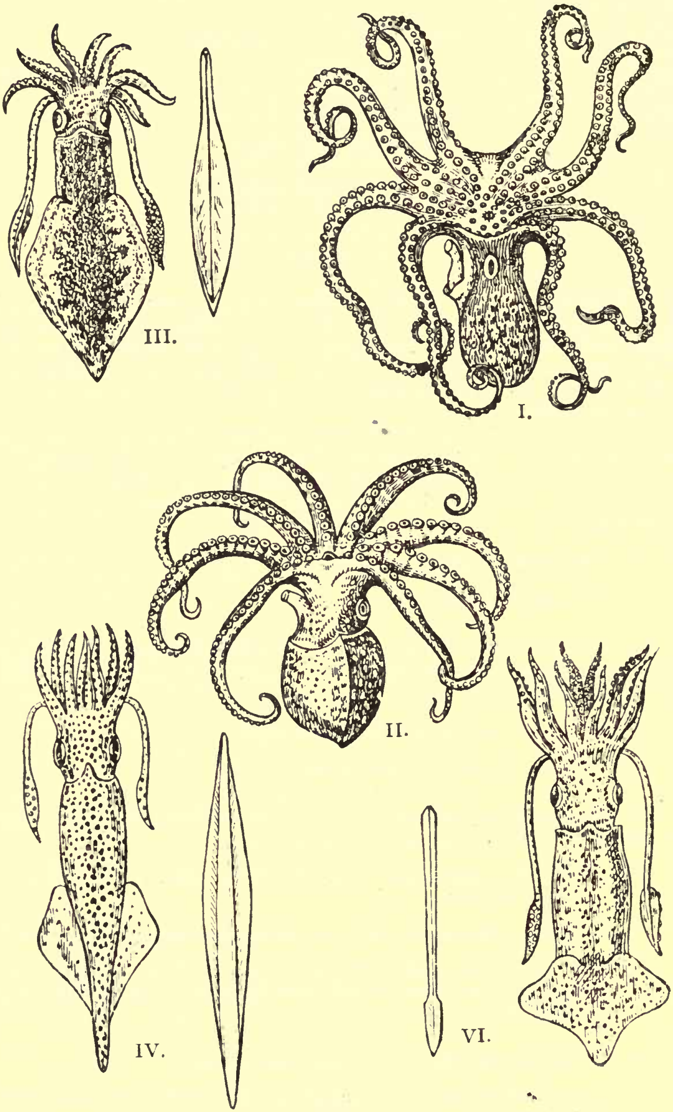
1. Octopus—having two rows of suckers.
2. Eledone—having one row of suckers.

The Decapoda are divided into thirteen families, of which three are recognised as British, these being—

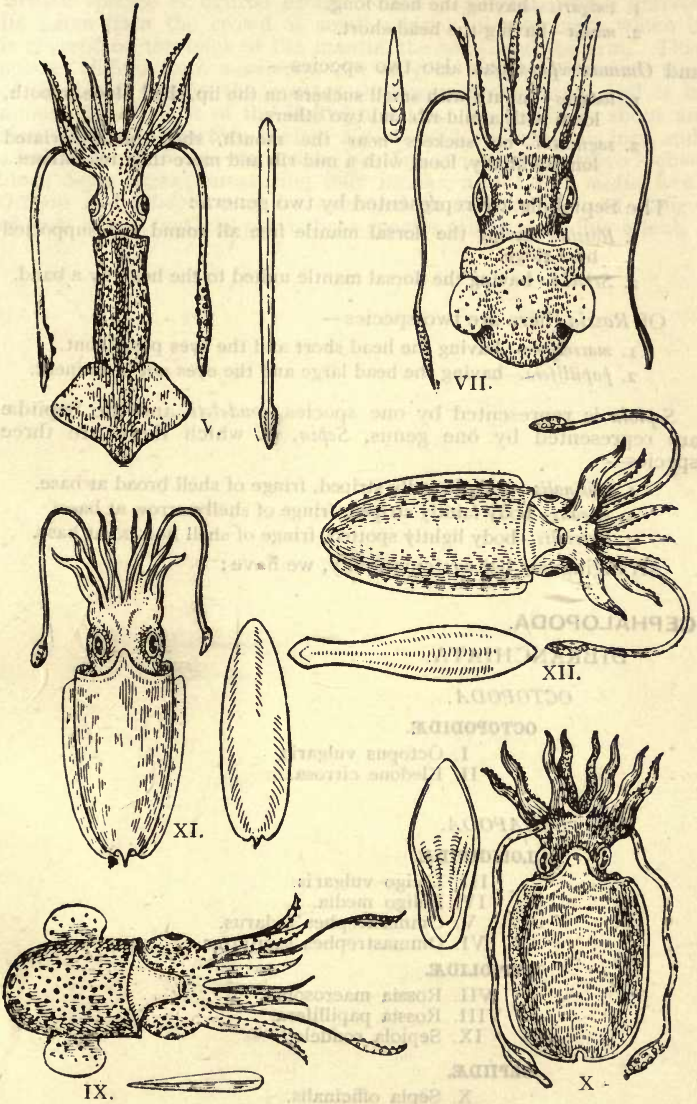
1. Loliginidæ—having the shell narrow, pointed in front and as long as the back.
2. Sepiolidæ—having the shell narrow and half as long as the body.
3. Sepiidæ—having the shell with a thin chitinous margin, oval, thick in front, the posterior ventral end being concave and ending in a spine.

The Loliginidæ are represented by two genera:

1. *Loligo*—having the shell keeled on the ventral side, eyes with closed cornea.
2. *Ommastrephes*—having the shell ending in a hollow cone, eyes with open cornea.


III.
I.
II.
IV.
VI.

British Cuttle Fishes.


V.
VII.
XII.
XI.
X.
IX.

BRITISH CUTTLE FISHES.

Of these genera, *Loligo* has two species—

1. *vulgaris*—having the head long.
2. *media*—having the head short.

and *Ommastrephes* has also two species—

1. *todarus*—mouth with small suckers on the lip, shell blade smooth, loom with a mid-rib and two others.
2. *sagittatus*—no suckers near the mouth, shell blade striated longitudinally, loom with a mid-rib and more than two others.

The Sepiolidæ are represented by two genera:

1. *Rossia*—having the dorsal mantle free all round and supported by a ridge.
2. *Sepiola*—having the dorsal mantle united to the head by a band.

Of *Rossia* there are two species—

1. *macrosoma*—having the head short and the eyes prominent.
2. *papillifera*—having the head large and the eyes not prominent.

Sepiola is represented by one species, *rondeleti*, and the Sepiidæ are represented by one genus, *Sepia*, of which there are three species—

1. *officinalis*—body broadly striped, fringe of shell broad at base.
2. *elegans*—body faintly striped, fringe of shell narrow at base.
3. *biserialis*—body lightly spotted, fringe of shell hooded at base.

Arranging our list systematically, we have:

CEPHALOPODA.

DIBRANCHIATA.

OCTOPODA.

OCTOPODIDÆ.

I. Octopus vulgaris.
II. Eledone cirrosa.

DECAPODA.

LOLIGINIDÆ.

III. Loligo vulgaris.
IV. Loligo media.
V. Ommastrephes todarus.
VI. Ommastrephes sagittatus.

SEPIOLIDÆ.

VII. Rossia macrosoma.
VIII. Rossia papillifera.
IX. Sepiola rondeleti.

SEPIIDÆ.

X. Sepia officinalis.
XI. Sepia elegans.
XII. Sepia biserialis.

In the accompanying illustrations, on pages 26 and 27, every British species is figured except *Rossia papillifera*, which derives its name from the crowd of small, whitish pimples with which it is covered on the back of the mantle, the head, and the arm. This species differs from *macrosoma* not only in the proportionate size of the head, but in the greater stoutness of the body, and it is almost the smallest of the British cuttles. Its length is about an inch and three-quarters, that of *Sepiola rondeleti* being an inch and a half or less. *Rossia macrosoma*, like *Sepia biserialis*, is three inches long; *Sepia elegans* measuring four inches, and *Loligo media* five. *Octopus* and *Eledone* may be averaged at six inches, and *Loligo vulgaris* at two feet, the other three species rarely exceeding a foot.

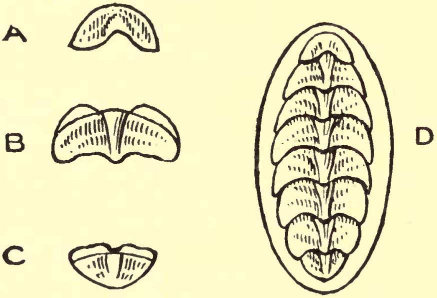
CHAPTER IV.

MULTIVALVES AND BIVALVES.

FOR the purposes of identification, the other mollusca may be divided into multivalves, bivalves, and univalves. This is, perhaps, a little too suggestive of classifying the races of mankind according to the clothes they wear, and the more so as many of the mollusca, like many of the men, never—or hardly ever—wear any clothes at all. But as we are dealing with shells, and most of us are more likely to become acquainted with the shell than with the wearer, it is advisable to begin in this way.

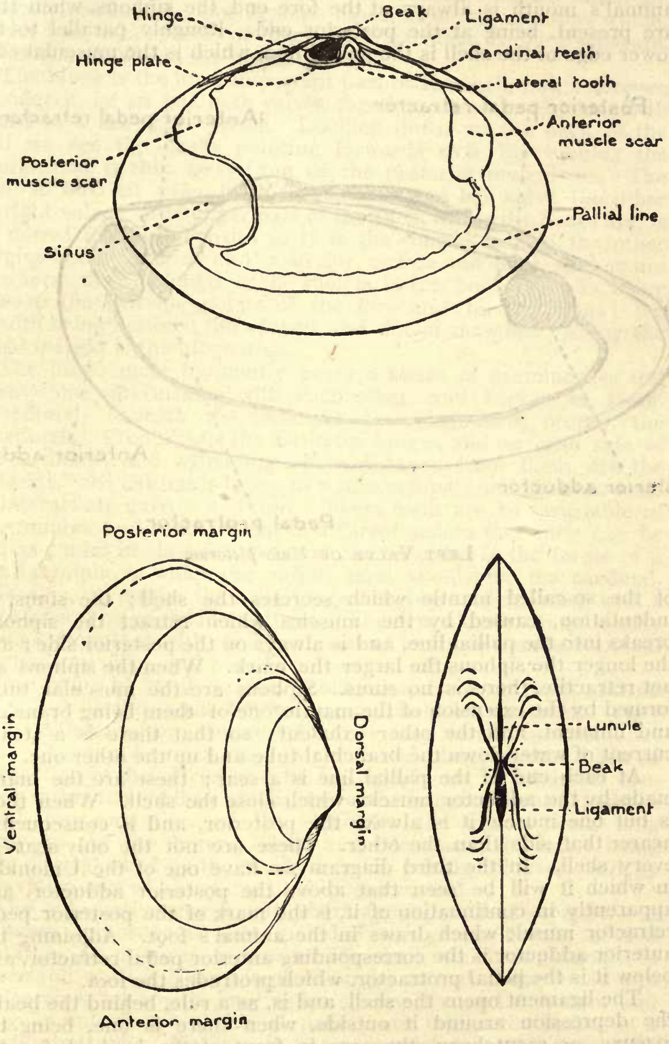
First, then, for the multivalvular shell; and it will not detain us long, as there is only one genus accepted as British which has a shell of the kind. That genus is *Chiton*, and its species can be recognised at once by the resemblance they bear to the ordinary woodlouse or garden armadillo.

In appearance the Chitons differ from any other mollusca, and it is at first sight difficult to believe that they belong to the sub-kingdom, or that they can be grouped with the Gastropoda as they now are. The shell is built up of eight plates, which overlap from behind forward, like the tiles of a house, so that the animal, when alarmed, can roll itself up into a ball. A head-piece of the shape A, a tail-piece of the shape C, and half-a-dozen plates of the shape B, are held together by a muscular girdle so as to form the shape D: which is distinctive enough to be left to speak for itself.



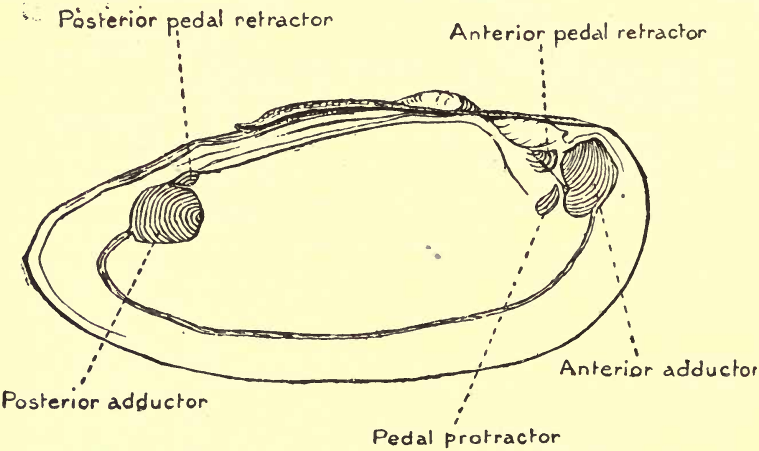
THE PARTS OF A MULTIVALVE SHELL (*Chiton discrepans*).

Having got rid of these unexpected forms, we can give our attention to the bivalves and univalves, taking the bivalves first, as being more easily dealt with, and less in number.


Hinge
Beak
Ligament
Cardinal teeth
Hinge plate
Lateral tooth
Anterior muscle scar
Posterior muscle scar
Pallial line
Sinus
Posterior margin
Ventral margin
Dorsal margin
Anterior margin
Lunule
Beak
Ligament

THE PARTS OF A BIVALVE SHELL (*Mactra glauca*).

At the outset let us have a diagram to illustrate the few terms we shall have to use. Here is one valve of a shell. At the top is the umbo or beak, which in this instance is not in the middle of the upper edge, but a little to the side to which it points. That side is the anterior side. Beaks almost always point forwards, and the animal's mouth is always at the fore end, the siphons, when they are present, being at the posterior end. Roughly parallel to the lower edge of the shell is the pallial line, which is the muscular edge of the so-called mantle which secretes the shell; the sinus, or indentation, caused by the muscles which retract the siphons, breaks into the pallial line, and is always on the posterior side; and the longer the siphons the larger the mark. When the siphons are not retractile, there is no sinus. Siphons are the muscular tubes formed by the extension of the mantle, one of them being branchial and inhalent, and the other exhalent: so that there is a steady current of water down the branchial tube and up the other one.



Left Valve of *Unio pictorum.*

At each end of the pallial line is a scar; these are the marks made by the adductor muscles which close the shell. When there is but one muscle it is always the posterior, and is consequently nearer that side than the other. These are not the only scars in every shell. In the third diagram we have one of the Unionidæ, in which it will be seen that above the posterior adductor, and apparently in continuation of it, is the mark of the posterior pedal retractor muscle which draws in the animal's foot. Adjoining the anterior adductor is the corresponding anterior pedal retractor, and below it is the pedal protractor, which protrudes the foot.

The ligament opens the shell, and is, as a rule, behind the beaks, the depression around it outside, when there is one, being the lozenge, or escutcheon, the area in front of the beaks being the lunule. When the hinge line is unusually long, the ligament extends on both sides of the beak. It may be wholly external or internal, or partly one and partly the other; when it is external, the edges of the shell are cut away to receive it, when it is internal, it fits into a sort of pit known as the fossette. Really it is made up of the ligament proper outside and the cartilage within, which are generally continuous; but in some cases, as in our example, which, by the bye, is a species of *Mactra*, the cartilage is quite separate, and is in a pit within the hinge.

The hinge is the most important part of the shell, but, before we consider it, let us put both valves together, so as to be clear with regard to a few more terms. Looking down on the back of the shell we see the beaks pointing forwards over the lunule; the anterior end is thus away from us, the posterior towards us. The valve to our left when in this position is the left valve, the other the right valve. The upper part of the shell, where the beaks are, is the dorsal margin, opposite to it is the ventral margin, the other margins being anterior and posterior, or fore and hind, as they are often termed. The length of the shell is, in this book, taken as being between the extreme points of the fore and hind margins; the breadth being between the ventral and dorsal margins. Along the dorsal margin is the hinge area.

The hinge most frequently bears a series of prominences and indentations interlocking with each other, and known as teeth. Immediately beneath the beak are the hinge-teeth proper, the "cardinals" (from *cardo*, the Latin for hinge), and on each side of the cardinals, and extending some distance from them, are the "laterals," the cardinals being, as a rule, compact and pointed, while the laterals are narrow and thin. These teeth are so invariable in their number and arrangement in different genera that they can be used as guides in classification, and can be stated in the terms of a dental formula, in which the middle term stands for the cardinal. Thus 1, 2, 1, means that the hinge has two cardinal teeth with a single lateral on each side of them. There is almost every variety of hinge, from that with strong prominent teeth, to a mere series of serrations all alike, and even to no teeth at all.

One group of bivalves, the Pholadacea, have no teeth and no hinge, and, at the most, but a very rudimentary ligament. They are so different from the rest that we may as well sort them out first. They can be recognised by the dorsal plates on the back of the junction of the valves, and by the apophyses or falciform processes within the shell to which some of the muscles are attached. In British representatives of the sub-order the genera with long apophyses are the borers *Pholas* and *Pholadidea*, the latter being easily distinguished by the shell not being prickly all over, and by its having a sort of horny cup at its posterior end.

The only native genus with short apophyses is *Xylophaga*. In the same sub-order is now included the genus *Teredo*, of evil reputation as a borer of wood. Its shell, which is difficult to understand until it is seen in place on the animal, is continued into a calcareous tube with long siphons, near the end of which, and acting as valves, are a pair of pallets not unlike the scales of a gigantic butterfly. No one is likely to mistake a *Teredo* for any other mollusc.

The bivalves used to be classified on the pallial line; it was not a perfect system in some ways, but it comes in excellently as a guide in dealing with the shells only, and, with a few qualifications of the free and easy sort, we will adopt it here. It is possible to divide the group into those with the pallial line indented and those with it entire, but those without the indentation are so numerous that the table is too long to work with readily. Hence we will keep to the old lines, and, as shown in the alphabetical list of British genera herewith, have three categories:

A. Those having the pallial line not indented and having no siphons.

B. Those having the pallial line not indented and having short siphons.

C. Those having the pallial line indented and having long siphons.

In the C division everything is straightforward. With regard to A, all that can be done is to run through it, and if the genus cannot be discovered, to pass on to B, which is not so difficult after all, and will be found to be much more expeditious than with any combination of the two. We say genus, for the British bivalves are comparatively so few that we can afford to disregard orders, sub-orders, and families, and deal with the genera direct, which is more satisfactory, as they are least likely to be affected by changes in classification.

Let us look, then, if our shell's pallial line be indented or not, and if it be, we will assume that the animal had no siphons. We will then ask if the valves are of the same size, or is one larger than the other? Is it

1. Inequivalve, or
2. Equivalve?

Supposing it be inequivalve, is it equilateral, or nearly so? That is, does a straight line dropped perpendicularly from the beak to the ventral margin divide the surface of the valve into halves? If it does, has the shell any ears—that is, winged processes on the side of the beak? If it has ears, the shell is a *Pecten;* if it has none, it is either *Anomia* or *Ostrea:* the former if it has the hole in its lower valve through which passes the byssus by which it is fastened to the rock, the latter if it has no hole. Here we have:

Equilateral, or nearly so—
  With ears—*Pecten.*
  Without ears—
    With hole—*Anomia.*
    Without hole—*Ostrea.*

If the shell is markedly inequilateral, we can further advance to:

Very oblique—
  With teeth—*Avicula.*
  Without teeth—*Pinna.*

Neither of these is like anything else: in fact, the five genera thus chosen are easy ones to begin with.

Pallial line not indented—

No siphons—
- Anodonta.
- Anomia.
- Arca.
- Avicula.
- Axinus.
- Crenella.
- Dreissensia.
- Leda.
- Lima.
- Limopsis.
- Modiolaria.
- Mytilus.
- Nucula.
- Ostrea.
- Pecten.
- Pectunculus.
- Pinna.
- Unio.

Short siphons—
- Astarte.
- Cardium.
- Circe.
- Cyamium.
- Cyprina.
- Diplodonta.
- Galeomma.
- Isocardia.
- Kellia.
- Lasæa.
- Lepton.
- Loripes.
- Lucina.
- Montacuta.
- Pisidium.
- Sphærium.

Pallial line indented—

Long siphons—
- Amphidesma.
- Ceratisolen.
- Corbula.
- Donax.
- Gastrana.
- Gastrochœna.
- Lucinopsis.
- Lutraria.
- Lyonsia.
- Mactra.
- Mya.
- Neæra.
- Pandora.
- Panopæa.
- Petricola.

Long siphons—
- Pholadidea.
- Pholas.
- Poromya.
- Psammobia.
- Saxicava.
- Scrobicularia.
- Solecurtus.
- Solen.
- Tapes.
- Tellina.
- Teredo.
- Thracia.
- Venerupis.
- Venus.
- Xylophaga.

Now let us deal with those in which the valves are of equal size. These we can divide into those with ears and those without; and those with ears we can then subdivide into that with teeth, which is *Limopsis*, and that without, which is *Lima*, the latter being further distinguished by having one muscular scar while the former has two. We thus get:

Shell equivalve—
  With ears—
    With teeth—*Limopsis.*
    Without teeth—*Lima.*

We can continue this:

  Without ears—
    Hinge with many teeth—
      Hinge straight—*Arca.*
      Hinge curved—
        Shell round—*Pectunculus.*
        Shell elongated—*Leda.*
        Shell trigonal—*Nucula.*

Here *Arca*, with its long, straight row of teeth all alike, is unmistakable; *Pectunculus* has its teeth in two groups, one on each side of the beak, and affords the first instance of the evolution of the forms of teeth; in *Leda* the shell is lengthened out at the posterior end so as to give it a somewhat leg-of-mutton appearance, and the teeth on each side of the beak are nearly equal in number; in *Nucula*, which has a shell like a nut, the teeth are much more numerous on the posterior side than on the other.

The next group can include those having few or no teeth, and one of them, *Axinus*, can be picked out at once, owing to its shell being almost circular. That leaves us with the rest inequilateral, which we can separate into those with the ligament external and those with it internal. The former we can further sort into:

Teeth conspicuous—*Unio.*
Teeth inconspicuous—*Anodonta.*

Those with an internal ligament are only four in number:

Crenella, which has radial ribs and one upright tooth, the hinge margin being crenulaied behind the ligament.

Modiolaria, which has two groups of striations, one down each margin.

Dreissensia (the fresh-water mussel), which is very oblique, and has the beaks terminal and pointed and has a shelf within the beak.

Mytilus (the salt-water mussel), which is of similar shape but has no shelf.

If our specimen is not one of these, and they are all distinct in form, we must proceed to the genera in which the pallial line is not indented and the animal is not siphonless, though the siphons are not very long. Of these there are only sixteen, one of which—*Cardium*—has bold radial ribs; one—*Isocardia*—has twisted beaks; and one—*Lepton*—is oblong with almost square corners. Let us put this into form:

Grooves radial—*Cardium.*
Grooves concentric—
  Beaks twisted—*Isocardia.*
  Beaks not twisted—
    Hinge without teeth—*Galeomma.*
    Hinge with teeth—
      Shell oblong—*Lepton.*
      Shell triangular—
        Two teeth in each valve—*Astarte.*
        Three teeth in each valve—*Circe.*

Here, *Astarte*—the more important genus—can be further distinguished by its having all the teeth entire, while *Circe* has one tooth cloven, so as to make the three look like four. We can continue this table:

Shell circular or sub-orbicular—
  Ligament internal—
    Anterior scar long and extending within pallial line—*Loripes.*
    Anterior scar orbicular—*Montacuta.*
    Anterior scar oval—
      Left cardinal small—*Lasæa.*
      Left cardinal thick and erect—*Kellia.*

In this group *Montacuta* is at once distinguishable from *Loripes* by its much smaller size, and *Lasæa* from *Kellia* by its reddish colour. Our next genus had better be *Diplodonta*, of which our only representative is a beautiful little shell, white and almost transparent, equivalve and almost circular, with a double ligament more or less external and with two teeth in each valve, the anterior in the left and posterior in the right being bifid. Next to it we will place *Cyamium*, the smallest of our bivalves, which can only be examined under the microscope, and is recognisable at once by its ligament rising conspicuously above the level of its dorsal line. There are two other genera in which the ligament is obtrusively apparent, though it is partially overlapped in a groove. These are *Lucina*, which has the anterior scar narrow and projecting a long way within the pallial line; and *Cyprina*, in its solitary species, one of the finest of British shells, thick, large, and heavy, in which the muscular scars are so oval and shiny as to be characteristic, though it is hardly worth while to look inside when the outside is so unmistakable.

We have nearly finished with Division B. Only two genera remain, and these used to be one. In them the ligament is inconspicuous, and the shell horny and translucent. One of them, *Sphærium*, has the beak almost midway; the other, *Pisidium*, has the beak near the anterior end. Both of them are freshwater. They are the only British representatives of the Cyrænidæ.

Our third division includes all those bivalves in which the pallial line is indented by the impression caused by the insertion of the siphon's retractor muscle. The impression shows that the siphons are long compared to the length of the shell, and the siphons are long because the animal lives buried in the sand and has to thrust these tubes up into the water to be able to breathe. As we have said before, one of these siphons is exhalent, the other inhalent. The inhalent, or branchial siphon, is that near the ventral margin; the upper one, nearer the beak, is the anal. In the numerous cases in which they end differently, the one that bears the tentacles, or more tentacles than the other, is the branchial siphon.

This group of genera can be divided into those with one valve larger than another and those with equal valves; and those with equal valves can be further divided according to the way in which they gape. In this way, we get two groups of three each:

- Shell inequivalve—
  - Nearly equilateral.
  - Elongated at posterior end.
  - Truncated at posterior end.

- Shell equivalve—
  - Gaping at both ends.
  - Gaping at posterior end.
  - Gaping at neither end.

In the first triad there are only four genera. *Lyonsia* is nearly equilateral, and any doubt concerning it can be set at rest by a look at the ligament, which is in an internal groove. *Pandora* is elongated at the hinder end. *Thracia* and *Corbula* are both truncated at the hinder end, but *Thracia* is much larger than the other, and has a crescentic ossicle in its cartilage pit; while *Corbula* has no ossicle, and fixes its cartilage in a cavity of its solitary cardinal. In appearance the only native species of *Corbula* is more like a brachiopod than any other bivalve.

The equivalve shells that gape at both ends can also be divided into three categories. Of the first the sole representative is *Mya*, which has a broad shell with a broad, short shelf, not unlike the scale of a fish. Of the second the only representative is *Lutraria;* its shell is oblong, and very oblique. The third is made up of the Solenidæ, and is as follows:

- Shell long and narrow—
  - Hinge nearly midway, with radiating ribs—*Ceratisolen.*
  - Hinge terminal with one cardinal in the right valve—*Solen.*
  - Hinge sub-terminal with two cardinals in the right valve—*Solecurtus.*

Ten genera are represented in the group having the shell gaping at the posterior end. Two of them have the cartilage in a triangular cavity under each beak, these being *Poromya*, which has an oval shell, and *Neæra*, in which the hinder end is lengthened out into a sort of stalk. Two of them have the shell cut off short at the hinder end, these being *Panopæa*, which has the pallial line continuous, and

Saxicava, in which it is broken up. One genus, *Scrobicularia*, has the beaks turned away from the fore end; another, which has a wrinkled periostracum extending over the siphons, is in this group only as regards one of its species, *Mya binghami*. One shell, *Gastrochæna dubia*, has a long, calcareous sheath; one, *Petricola*, is long and thin and prickly, and looks like a narrow *Pholas*; one, *Venerupis*, is decorated with concentric rows of plates almost as thin as paper; and the tenth, *Psammobia*, is striated concentrically, and also (more or less faintly) radially, particularly at one end in the case of two of the species, *ferroensis* and *costulata*, besides being distinguishable by its flat, narrow shape, and its beautiful rays of subdued pinks and purples.

Nothing would be gained by here tabulating this rather miscellaneous lot, and we can proceed to our last group in which the shell does not gape at either end. These we can divide into those having the ligament partly external and partly internal and those in which it is wholly external. Thus:

Ligament partly external—
    Teeth unequal in both valves—*Mactra*.
    Teeth unequal in right valve only—*Amphidesma*.

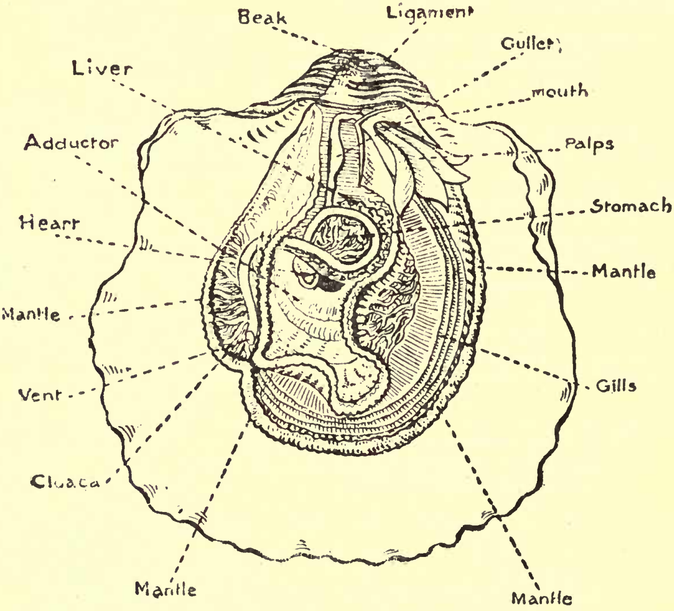
Concerning which it may be worth noting that one only—*Amphidesma*—is reddish brown, while all the species of *Mactra* are white or pale stone colour. We are left with those shells in which the ligament is entirely external, and these can be sorted out into:

Teeth two in right valve—
    Inside margins notched—*Donax*.
    Inside margins not notched—
        Shell with a white ray—*Donax politus*.
        Teeth in left valve unequal—*Gastrana*.
        Teeth in left valve equal—
            Shell as broad as long—*Lucinopsis*.
            Shell not so broad as long—*Tellina*.

Teeth three in both valves—
        Sinus rounded—*Tapes*.
        Sinus angular—*Venus*.

Here the only difficulty is with *Donax*, two species of which have toothed edges, while the other has the edges smooth but is at a glance recognisable by the white ray extending from the beak to the ventral margin. Another *Donax*, *trunculus*, can be picked out at once by the curious manner in which it is cut off short, making it look like half a shell, so that among the bivalves it is what the sunfish is among fishes. Both *Gastrana* and *Lucinopsis* are thin and fragile; and of the last pair *Tapes* can be distinguished from *Venus* by its being more oval and oblique, its only species approaching to a roundish form being *decussatus*, which can be identified among the crowd by the bold and numerous radiating striæ which seem to ripple from its beaks.

Hitherto we have been dealing with the shells; let us now direct our attention to those who live in them. Let us leave conchology, the study of the shell, for malacology, the study of the mollusc. The animal of *Tapes decussatus* has long been a favourite article of food on the continent. It is oval and white, and the margins of its mantle have a scalloped fringe. The siphons are equal, and separate all the way up, and they are of a yellowish tint, dotted towards the base and middle and speckled towards the end with light brown. The orifice of the inhalent siphon has a double border of a dozen long cirrhi alternated with a dozen that are not so long, but the exhalent siphon has some twenty simple cirrhi, which, like the others, are brown. The foot has a byssal groove, and is large, white, and lanceolate, and, like the other parts, well-marked; in fact, the species is an excellent one for dissection. Let us, however, as our example, take a better known edible bivalve, the common oyster, which everyone can get and experiment upon.



PARTS OF AN OYSTER (*Ostrea edulis*).

Here we have an oyster with the flat or left valve removed. At the top is the beak, and near it is the ligament which opens the valves, and almost in the centre is the adductor which closes the valves, and which being cut through close to the shell by the expert opener, allowed of the left valve being pulled up by the ligament, as if the animal were dead and the muscular power had been lost.

There is but one adductor; the anterior, as in the pectens, having become atrophied owing to the shape of the shell bringing the hinge and two adductors into line. To make up for this, the surviving adductor, the posterior, having more to do, becomes of conspicuous size.

Above the adductor, on the median line, is the heart, with its single ventricle and two auricles, pulsating in the pericardium as it drives the colourless blood through the system. Below the ligament is the mouth, with its palps, leading down into the gullet and the stomach, and onwards to the intestine. Round the loop of the intestine is the greenish-brown liver, from which the tubes lead into the stomach and carry into it the digestive fluid.

On the anterior side the gills start from the palps and curve halfway round. The gills are the "beard," which everyone does not appreciate as an article of food, and is often thrown away by the opener. There are two gills, each consisting of two thin plates, flat, but diminishing in thickness towards the outer edge. The blood is brought through the arteries to a venous canal, and thence through the renal organ to the gills, whence, after being aerated, it returns by a canal on each side to the two auricles, or rather the one auricle which is in two divisions. Outside the gills, and extending all round, is the mantle, which encloses the body, and is protected by the shell it secretes.

The oyster has no foot and no siphons, but its general body structure may be taken as representing that of the rest of the class. One family, however, is so unlike the others that some explanation is necessary. The family contains the one genus, *Teredo*, the shipworms. The shipworm is a worm in appearance, with a pair of valves protecting one end and a pair of pallets protecting the other. The animal, so far as its principal organs are concerned, is very small, and is contained within the nut-like pair of valves that are without either hinge or ligament. The siphons, into which the gills are prolonged, occupy eleven-twelfths of the length. These siphons secrete a shelly lining as the animal burrows its way into the wood, and at their point of separation are placed the calcareous pallets which close the tube against intruders. The larger of the siphons takes in the water charged with air and food, and down the smaller tube is ejected the spent water and the woody pulp formed as the animal bores deeper and deeper out of its own danger to the danger of the unsuspecting mariner.

Our species of *Teredo* are all easily distinguishable by their pallets, those of *bipinnata* being, as figured on the coloured plate, of most characteristic structure. They are five times the length of the valves, their blades being composed of about fifty conical joints nested one within another, having feathered edges fringed on each side. The stalk, instead of being short, as in the other species, is long and slender and minutely tuberculated. It may be added that in the plate there are shown a single valve and pallet of each species, with a figure of the tube in the case of No. 167.

One more note. Brachiopods have shells not unlike those of pelecypods, and are frequently listed with the British mollusca. What a brachiopod may be is rather a puzzle, but it is certainly not a mollusc; and it ought therefore to be out of our range. As, however, only eleven species are claimed as British, we may as well give the list:

TESTICARDINES—

Terebratulidæ—

Terebratulina caput serpentis.
Terebratula capsula.
Waldheimia cranium.
Waldheimia septigera.
Terebratella spitzbergenensis.
Argiope decollata.
Cistella cistellula.

Rhynconellidæ—

Atretia gnomon.
Rhynconella psittacea.

ECARDINES—

Craniidæ—
Crania anomala.

Discinidæ—
Discinisca atlantica.

For the purposes of identification we can tabulate these genera as follows:

- Shell without hinge—
  - Foramen in ventral valve—*Discinisca.*
  - No foramen—*Crania.*
- Shell with hinge—
  - Loop reflected—
    - Loop attached to septum—*Terebratella.*
    - Loop not attached to septum—
      - Shell smooth—
        - Loop small—*Terebratula.*
        - Loop large—*Waldheimia* (as regards *cranium*).
      - Shell striated—*Terebratulina.*
      - Shell ribbed—*Waldheimia* (as regards *septigera*).
  - Loop not reflected—
    - Shell semi-ovate and ribbed—*Argiope.*
    - Shell without ribs or striations—*Cistella.*
  - No loop, but short, curved crura—
    - Foramen beneath beak—
      - Black in colour—*Rhynconella.*
      - Not black in colour—*Atretia.*

As for our own convenience we arranged our illustrations in a way peculiar to ourselves, it is desirable that we should here give in brief one of the systematic schemes that has much to recommend it, mentioning only such families as are represented in the British fauna so far as at present known.

I. CEPHALOPODA.
  i. Dibranchiata.
    1. Octopoda.
      Octopodidæ.

    2. Decapoda.
      1. Phragmophora.
        Spirulidæ (drifted specimens only).
      2. Sepiophora.
        Sepiidæ.
      3. Chondrophora.
        Sepiolidæ.
        Loliginidæ.
        Ommastrephidæ.

  ii. Tetrabranchiata (none).

II. GASTROPODA.
  i. Amphineura.
    1. Polyplacophora.
      Lophyroidea.
    2. Aplacophora (none).

  ii. Prosobranchiata.
    1. Diotocardia.
      1. Docoglossa.
        Acmæidæ.
        Lepetidæ.
        Patellidæ.
      2. Rhipidoglossa.
        Zygobranchiata.
          Fissurellidæ.
          Haliotidæ.
          Pleurotomariidæ.
        Azygobranchiata.
          Cyclostrematidæ.
          Trochidæ.
          Turbinidæ.
          Neritidæ.

    2. Monotocardia.
      1. Ptenoglossa.
        Ianthinidæ.
        Scalariidæ.

2. Tænioglossa.
Platypoda.
Naticidæ.
Lamellariidæ.
Trichotropidæ.
Capulidæ.
Homalogyridæ.
Littorinidæ.
Cyclostomatidæ.
Aciculidæ.
Truncatellidæ.
Rissoidæ.
Hydrobiidæ.
Assimineidæ.
Skeneidæ.
Jeffreysiidæ.
Adeorbidæ.
Viviparidæ.
Valvatidæ.
Cerithiidæ.
Turritellidæ.
Cæcidæ.
Aporrhaidæ.
Cypræidæ.
Tritonidæ.
Heteropoda (none).

3. Gymnoglossa.
Eulimidæ.
Pyramidellidæ.

4. Rachiglossa.
Muricidæ.
Columbellidæ.
Nassidæ.
Buccinidæ.
Fasciolariidæ.
Marginellidæ.

5. Toxoglossa.
Conidæ.

iii. Opisthobranchiata.

1. Tectibranchiata.

1. Bulloidea.
Actæonidæ.
Tornatinidæ.
Scaphandridæ.
Bullidæ.
Philinidæ.

2. Aplysioidea.
Aplysiidæ.

- 3. Pleurobranchoidea.
  - Pleurobranchidæ.
  - Runcinidæ.
- 4. Siphonarioidæ (none).

- 2. Pteropoda.
  - 1. Thecosomata.
    - Limacinidæ.
    - Cavoliniidæ.
  - 2. Gymnosomata.
    - Clionidæ.
- 3. Ascoglossa.
  - Hermæidæ.
  - Elysiidæ.
  - Limapontiidæ.
- 4. Nudibranchiata.
  - 1. Cladohepatica.
    - Æolididæ.
    - Lomanotidæ.
    - Dotonidæ.
    - Dendronotidæ.
    - Scyllæidæ.
    - Pleurophyllidiidæ.
    - Tritoniidæ.
  - 2. Holohepatica.
    - Dorididæ.
    - Polyceridæ.
    - Goniodoridæ.

- iv. Pulmonata.
  - 1. Basommatophora.
    - Auriculidæ.
    - Otinidæ.
    - Limnæidæ.
    - Physidæ.
  - 2. Stylommatophora.
    - Testacellidæ.
    - Limacidæ.
    - Helicidæ.
    - Pupidæ.
    - Stenogyridæ.
    - Succineidæ.
    - Onchidiidæ.

III. SCAPHOPODA.

- Dentaliidæ.

IV. PELECYPODA.

- i. Protobranchiata.
  - Nuculidæ.

- ii. Filibranchiata.
  - 1. Anomiacea.
    - Anomiidæ.
  - 2. Arcacea.
    - Arcadæ.
  - 3. Mytilacea.
    - Mytilidæ.
- iii. Pseudolamellibranchiata.
  - Aviculidæ.
  - Ostreidæ.
  - Pectinidæ.
  - Limidæ.
- iv. Eulamellibranchiata.
  - 1. Submytilacea.
    - Carditidæ.
    - Astartidæ.
    - Cyprinidæ.
    - Unionidæ.
    - Dreissensiidæ.
    - Lucinidæ.
    - Erycinidæ.
    - Galeommidæ.
    - Cyrænidæ.
  - 2. Tellinacea.
    - Tellinidæ.
    - Scrobiculariidæ.
    - Donacidæ.
    - Mactridæ.
  - 3. Veneracea.
    - Veneridæ.
    - Petricolidæ.
  - 4. Cardiacea.
    - Cardiidæ.
  - 5. Myacea.
    - Psammobiidæ.
    - Myidæ.
    - Solenidæ.
    - Glycimeridæ.
    - Gastrochœnidæ.
  - 6. Pholadacea.
    - Pholadidæ.
    - Teredinidæ.
  - 7. Anatinacea.
    - Pandoridæ.
    - Lyonsiidæ.
    - Anatinidæ.
- v. Septibranchiata.
  - Poromyidæ.

CHAPTER V.

UNIVALVES.

LIKE all things else the mollusca are more interesting the more we know of them. They are far from being the mere masses of flesh or jelly they may seem at first sight. Their structure is anything but simple; their organs are well defined; their senses are in full complement.

They can see. The Razor-shell will pop down into its hole at your near approach; the Oyster will snap its valves as the shadow of your boat goes over it; and *Cyclostoma* will shut itself in with its operculum if you hold a stick within a foot of it. The old rhyme of beating the snail is not so meaningless as it appears, but the snail will retire into its shell instead of coming out of it if the stick be held within its range of vision, which has been found to be two inches, the Helicidæ being among the most short-sighted of their class. To say nothing of the great orbs, fifteen inches across, of the giant cuttle, it is difficult to forget the range of gems along the mantle edges of the *Pecten*, who requires a good look-out as he drives himself along, hydraulically, by clapping his valves together and squirting the water from each side of his hinge.

They can hear. The Swan Mussel will shut its shell at the sound of a whistle or of a creaking door, and *Anomia* will close up as soon as you favour it with a musical note of a certain pitch. Yet the ears are not external, and in only one family, the Nuculidæ, has a free communication been discovered between the otocyst (that is, the organ of hearing), and the exterior.

They can smell. All the whelks in the neighbourhood will gather round a lobster pot; hang a piece of meat over sand in which a *Nassa* is buried, and he will come up in a hurry to see what he can get; a *Helix* will come a hundred yards after a strawberry, and retreat fifty from a whiff of turpentine; an *Arion* has been seen making for a bean-pod in a road, the pod has been picked up and the *Arion* has stopped and gone round and round waving his tentacles; the pod has been placed on the road again and the *Arion* has made straight for it, and again it has been shifted, so that the unfortunate slug has been led backwards and forwards at will.

They can feel. Nothing is more noticeable than the varied forms of their organs of touch—the tentacles, palps, mantle-lobes, arms, and crowns, which are found amongst them. They can taste, and are particular in their choice of food, except in respect of the few that are omnivorous. And some of them, when hungry, are unexpectedly bold in their choice of prey, as *Limnæa peregra* in feeding on minnows, and *Limnæa stagnalis* in choosing newts and sticklebacks; and some are cannibalistic, or nearly so, as *Helix pisana* or *Helix ericetorum.*

They have the sense of locality. Allowing for his limited means of locomotion, a snail is as good a homer as a pigeon. He will go out every evening and be found at home again every morning; and, what is more, he can find food over a garden wall and return to tell his mate and take her back with him to have a meal, and then escort her home again; and for months he has been known to live in the same crevice, from which, in one case at least, he has been taught to come out and show himself when spoken to. And it is not only the land species that go foraging, even the limpet will go for a cruise as soon as the rising tide covers it, and returns to its pit before the ebb has left it dry again.

Slow as a snail may be, he is not weak. He can drag vertically nine times his own weight, and there is one experiment of Sandford's in which a specimen weighing a third of an ounce dragged along a smooth table twelve reels of cotton, a pair of scissors, a screwdriver, a key, and a knife, all tied on one behind the other, the weight of the load being seventeen ounces, or more than fifty times the weight of the drawer, the proportion being the same as if a twelve-stone man were to pull along 3 tons 15 cwt.

The strength of a mollusc lies in its so-called foot, an organ which has been described as a thickening of a portion of the integument, modified to give different forms of motion. In some cases the motion occurs only during infancy, and is very slight; in others it lasts through life, and is of even a violent character, as in the case of the cockles, which move in a succession of long hops. Some, like *Natica*, use the foot as a sand plough; some, as the Tectibranchs, as a fin to swim with; some, as *Mya*, as a spade to dig with; some, as *Pholas*, as a drill to bore with. Sometimes it is comparatively large, as in the slugs; sometimes it is almost aborted, as in the oysters; but more or less it is always present, and it is the characteristic organ of the mollusca.

Attached to the foot in the gastropods is the operculum, the plate with which when the animal withdraws into his shell he closes the mouth. It is not always present and not always solitary; sometimes in specimens of *Buccinum undatum* there are two or three opercula. It is absent in all the British land shells, except *Cyclostoma* and *Acicula.* It used to be considered as representing the second valve in the bivalves, but it is not produced by the mantle; by others it was regarded as corresponding to the byssus, that bunch of horny threads used as a means of attachment by the mussels, etc., but it differs from it in not being due to a special gland. It varies in composition, being of almost every intermediate grade between horn and shell, and it is of all degrees of thickness and of many shapes, ranging from a mere thin flake to what looks like a well-formed discoidal shell. In the land shells it is represented by the epiphragm, which is a stopper of hardened mucus secreted by the liver cells, and formed only during periods of inactivity as a protection from the weather or the enterprising enemy.

The shell is secreted by the mantle, which is an expansion of the integument on the upper side. Each layer of the shell was once a portion of this covering, either in the form of a membrane or a cellular layer. Every part of the mantle can secrete shelly matter, but the work is mostly done by the margin, where the colour cells also lie. Occasionally the mantle edges turn up over the shell sufficiently far as to meet, and then the shell becomes internal. In the slugs this is shown in an advanced stage; in *Arion* the shell has disappeared all but a few granules; in some families it has disappeared altogether.

Nearly every form of spiral is represented in the class, from the flat disc to the narrow tube with almost parallel sides, and from whorls as close as those of a paper spill to whorls that nowhere touch each other; the majority right-handed, but many left-handed, and some with every intermediate stage between right and left, showing how the reversal has come about. The shell grows with the animal, who sometimes moves downwards from the upper whorls and leaves them decollate, as it is called, that is to decay and drop off. As it grows the periods of rest are marked by the lines of growth, and in some cases by either the thickening of the lip, which afterwards varies the surface with what is known as a varix, or by the row of spines which once fringed the mouth.

When young the lip is thin, but with age it usually thickens into a rib or is toothed or curved. The mouth is of every intermediate shape between a parallel gash and a circle, and is either with or without a notch or canal. When there are two of these notches or canals, that on the anterior side generally takes the siphon, while that on the posterior side carries the vent. When the mouth is not notched it is said to be entire, and this in most cases shows the animal to be a plant-eater, the notches or canals being generally distinctive of the carnivorous forms.

The mouth of the animal affords a similar guide to habits, although not so frequently, the vegetarians having the mouth on the surface of the head, while the flesh-eaters carry it on a proboscis; but there are many exceptions to this. This mouth—not the mouth of the shell—is furnished with lips which in many cases are extensile. In the bivalves it opens at once into the gullet, but in the rest of the class it leads into a pharynx, which is fitted with jaws for biting the food, and with a lingual ribbon, otherwise known as a radula or odontophore, with which the food is scraped into a triturated mass before it passes down the gullet into the stomach. The jaws are distinctive, not only of the genus but of the species; those of the freshwater pulmonates are recognisable at once by their pair of accessory side plates.

The radula consists of a series of hook-like teeth, made of chitin, the same substance as that of which the ligament of the bivalves is composed, and it is generally silvery-white, tipped occasionally with red or yellow. As it wears away in front it is pushed up by the new rows of teeth forming behind. Sometimes the worn-out teeth in front do not drop off, but are preserved in a special sac, the *askos*, from which the sub-order to which their species are assigned derives its name of Ascoglossa. In *Eulima*, *Stilifer*, and *Odostomia*, among others, the lingual ribbon is missing, and hence their genera are grouped as Gymnoglossa. The radula is also missing in the sea-hares and other nudibranchs, and a few more.

In the ordinary radula the ribbon consists of five rows of teeth, the central or rachidian, the laterals on either side, and the marginals at each edge. The rachidian is generally present; some genera have lost both it and the laterals; some have lost both laterals and marginals. One genus has but one tooth; in others the number runs into thousands. *Buccinum undatum*, for instance, has about 250, *Limnœa stagnalis* has over 8,000, *Helix aspersa* has about 15,000; in some of the Mediterranean species there are nearly three-quarters of a million. The radula is now used largely as a basis of classification. The Toxoglossa, represented in the British list by *Mangilia* and *Pleurotoma*, the ribbon is made up entirely of the marginals, which are largely developed. The Rachiglossa, represented in our list by *Trophon*, *Murex*, *Purpura*, *Lachesis*, *Columbella*, *Nassa*, *Buccinum*, *Buccinopsis*, *Fusus*, and *Marginella*, there is a central tooth with a single lateral. The Tænioglossa, comprising the species we have numbered from 370 to 460, that is, from *Natica* to *Triton*, have a rachidian, a lateral, and two marginals. In the Ptenoglossa, represented in our list by *Ianthina*, *Scalaria*, and *Aclis*, the radula consists of an indefinite number of hooked teeth with the largest on the margin. In the Rhipidoglossa, of which the British genera are *Fissurella*, *Puncturella*, *Emarginula*, *Haliotis*, *Scissurella*, *Cyclostrema*, *Trochus*, *Phasianella*, and *Neritina*, the laterals vary in number from nine to three, and the marginals are many and large. In the Docoglossa, represented with us by *Tectura*, *Lepeta*, *Propilidium*, *Patella*, and *Helcion*, the laterals and marginals are occasionally wanting, and the teeth are thick and beam-like. In *Lepeta* and *Propilidium* there is the usual central tooth, but in *Patella* this is replaced by four teeth, and in other genera by two. The ribbon in this group is lengthy; that of the common limpet is made up of 180 rows. This, however, is not the extreme length known; the periwinkle, for example, belonging to the Tænioglossa, has a radula 2½ inches long, containing 600 rows. For the purpose of describing these molluscan teeth concisely, a dental formula has been adopted on the ordinary lines; *Lepeta*, for instance, is given as 2, 0, 1, 0, 2, meaning 2 marginals on each side, no laterals, and 1 central tooth. In the other orders the teeth also differ in number and character, but this rapid glance at the seven sub-orders of the Prosobranchiates must suffice us.

The Prosobranchiates derive their name from the veins connected with the branchiæ being situated in front of the ventricle of the heart, those of the Opisthobranchiates being placed behind the ventricle. All the mollusca have a heart; sometimes it consists of a single auricle and ventricle, as in the Monotocardia; sometimes there are two auricles, as in the Chitons and the Diotocardia; sometimes there are four, as in the Nautilus; in all cases the number of auricles being the same as that of the branchiæ, by which the blood is aerated as it passes on its way.

The land mollusca breathe air, the water mollusca breathe water; but the freshwater mollusca that are without an operculum breathe air, though they live in the water, and take it down with them in bubbles on their visits to the surface, while the water mollusca that live within the tide range retain enough water for them to breathe until the return of the tide. Thus the mollusca may be said as a whole to breathe by gills, by lungs, and by the outer skin.

The Pulmonates, those that breathe by lungs, are divided into two sub-orders—the Basommatophora, in which the eyes are generally at the base of the tentacles, and the Stylommatophora, in which the eyes are at the tip of the tentacles. We have already mentioned the Prosobranchiates, with their two sub-orders of Diotocardia and Monotocardia, the first divided into Docoglossa and Rhipidoglossa, the second into Pteno—, Tænio—, Gymno—, Rachi—, and Toxoglossa; and the only gastropodous order left is the Opisthobranchiates, one sub-order of which, Ascoglossa, has also been mentioned, the others being the Tectibranchs, the Nudibranchs, and the Pteropods.

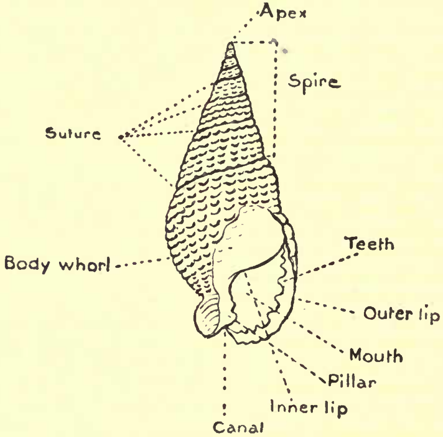
The Pteropods used to have an order all to themselves, but are now claimed to be gastropods adapted to a pelagic life by the modification of their foot into fins. Only three of their species are recognised as British. The Nudibranchs are the sea-slugs, gorgeous in protective colouring, that have no shell in the adult state and breathe either by the skin or by the organs developed on the back, which give them their characteristic appearance. The Tectibranchs have a shell more or less rudimentary and more or less enveloped in the foot or mantle, and their breathing is done by a single gill, also more or less covered by the mantle.

Between the Pelecypods and the Gastropods there are now placed the Scaphopods, which, unlike them, are not divided into orders, and consist of but one family, the Dentaliidæ. In our seas but three genera are represented, two of which are very rare. *Dentalium*, the common one, has a shell like a model elephant's tusk, some ten times as long as its diameter. The shell of *Siphonodentalium* is also tusk-like, but not more than five diameters in length, and further distinguishable by the four notches at its base. *Cadulus* is of a different shape, as can be seen by the drawing, and neither of them is likely to be mistaken for *Dentalium*.

In the Scaphopods the mantle has two folds to begin with, and these become united so as to deposit the cylindrical shell, which is open at both ends, the larger being the anterior, from which the long foot with its three terminal lobes is protruded, on which the animal creeps and by which it burrows in the sand. The head is small and cylindrical, the mouth surrounded by tentacles and in it a simple radula. The ventral side is the convex side. There is a blood circulation, but no heart; there are plenty of nerves, and, at least, an organ of hearing; and the sexes are separate. Simple as the elephant's tooth may look, it is highly organised enough to be placed by some near the Cephalopods, with the Gastropods below it.

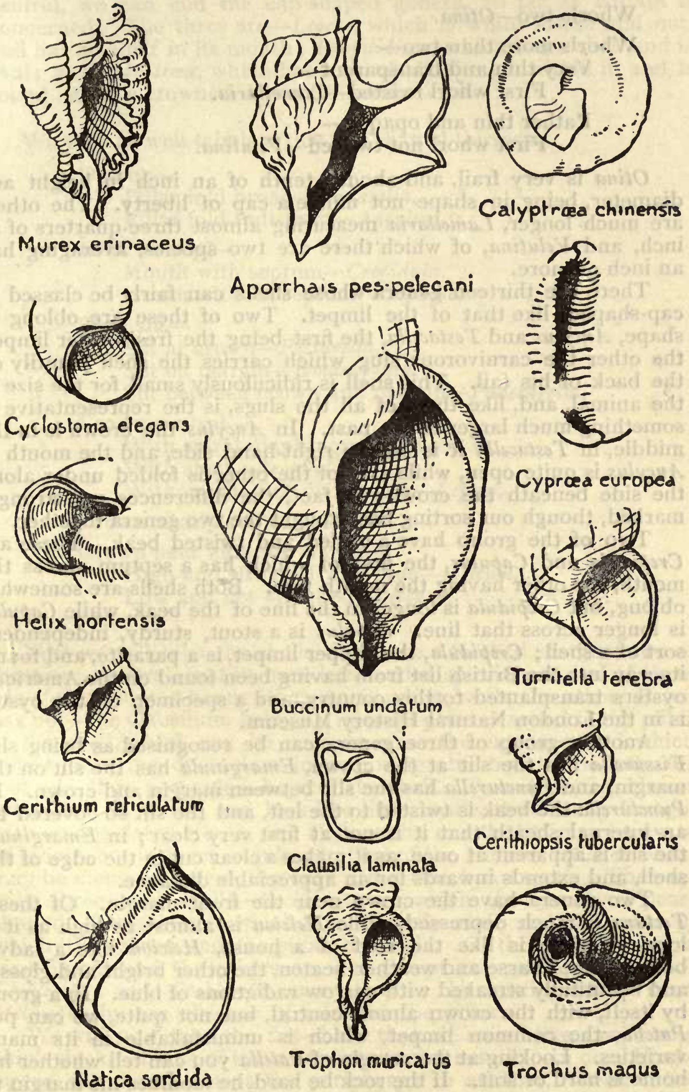
The shell of a gastropod may be divided into body-whorl and spire, as in the annexed diagram. The spire may consist of any number of whorls, increasing in size from the apex downwards. At the apex the shell began, and each whorl in turn was the body-whorl. The suture is the line of junction between the whorls, and it descends all the way from the apex to the mouth. As the shell grew the inner side of its whorls formed the columella or central pillar, around which they are arranged like steps in a spiral staircase. The mouth has its two lips, inner and outer; the outer one being often toothed, the inner being occasionally so. At the base is the canal, which in our example is very short and abrupt, but which in some genera is of considerable length, in others represented by a mere notch, and in many absent altogether. This is the anterior canal; in a few cases there is another canal, the posterior one, which is at the opposite side of the mouth.

The mouth has many varieties—a few of them are shown in our illustration—and we will use it as our chief aid in identification, beginning with those shells in which it has neither notch nor canal. There are a few forms it will simplify matters to get out of the way at the outset. For instance, there are two tubular shells, *Dentalium* and *Cæcum*. *Dentalium* and its allies we have already dealt with. *Cæcum*, which is a very small affair, is like a section of *Dentalium* when fully grown, for it loses its spire very early in life, and thus reduces itself to a straight or slightly curved cylinder.



PARTS OF A UNIVALVE SHELL. (*Nassa reticulata.*)

One genus, *Natica*, has a shell that is so markedly globular as to be at once distinguishable from the others. Four genera have shells that are ear-shaped. Of these, *Haliotis* can be sorted out at once from its large size and from its perforated lip. Through these perforations pass the tentacular appendages of the mantle, and as the animal grows the early holes are successively obliterated. *Haliotis* is represented in the British list by the one species *tuberculata*, which is frequently described as purely a Channel Islands native, but the specimen figured in our coloured plate came from South Devon.



Calyptrœa chinensis

Murex erinaceus

Aporrhais pes-pelecani

Cyclostoma elegans

Cyprœa europea

Helix hortensis

Turritella terebra

Buccinum undatum

Cerithium reticulatum

Cerithiopsis tubercularis

Clausilia laminata

Natica sordida

Trophon muricatus

Trochus magus

VARIETIES OF THE MOUTH.

The ear-shaped shells with an unperforated lip may be divided into

Whorls two—*Otina*.

Whorls more than two—
    Very thin and transparent—
        First whorl twisted—*Lamellaria*.

    Rather thin and opaque—
        First whorl not twisted—*Velutina*.

Otina is very frail, and about a tenth of an inch in height and diameter, being in shape not unlike a cap of liberty. The others are much longer, *Lamellaria* measuring almost three-quarters of an inch, and *Velutina*, of which there are two species, averaging half an inch or more.

There are thirteen genera whose shells can fairly be classed as cap-shaped, like that of the limpet. Two of these are oblong in shape, *Ancylus* and *Testacella*, the first being the fresh-water limpet, the other the carnivorous slug which carries the shell jauntily on the back of his tail. This shell is ridiculously small for the size of the animal, and, like those of all the slugs, is the representative of something much larger in the past. In *Ancylus* the crown is in the middle, in *Testacella* it is on the right-hand side, and the mouth of *Ancylus* is quite open, while that of the other is folded under along the side beneath the crown; in fact, the differences are strongly marked, though our sorting has brought the two genera together.

Two of the group have a curled and twisted beak. These are *Crepidula* and *Capulus*, the first of which has a septum across the mouth, the other having the mouth free. Both shells are somewhat oblong, but *Crepidula* is longer in the line of the beak, while *Capulus* is longer across that line. *Capulus* is a stout, sturdy, independent sort of a shell; *Crepidula*, the slipper limpet, is a parasite, and found its way into the British list from having been found on the American oysters transplanted to this country, and a specimen on the oyster is in the London Natural History Museum.

Another group of three genera can be recognised as being slit. *Fissurella* has the slit at the crown, *Emarginula* has the slit on the margin, and *Puncturella* has the slit between margin and crown. In *Puncturella* the beak is twisted to the left, and the slit so covered by an internal sheath that it is not at first very clear; in *Emarginula* the slit is apparent at once, as it makes a clear cut in the edge of the shell, and extends inwards for an appreciable distance.

Two genera have the crown near the front margin. Of these, *Tectura* is much depressed, while *Helcion* is almost as high as it is long. *Tectura* is like the roof of a house, *Helcion* like a lady's bonnet; one coarse and weather-beaten, the other bright and glossy, and beautifully streaked with narrow radiations of blue. In a group by itself, with the crown almost central, but not quite, we can put *Patella*, the common limpet, which is unmistakable in its many varieties. Looking at the margin of *Patella* you can tell whether his home is hard or soft. If the rock be hard, he modifies his margin to suit it; if it be soft, he scoops it out into a pit so deep that little more than the crown appears above it, and the crown—this is the important point—is never quite in the centre.

With another group of three, in which the crown is exactly central, we can end the cap-shaped genera, so far as Britain is concerned. The three are—*Lepeta*, which is white inside and out, and has no shelf in its mouth; *Propilidium*, which has a shelf and is oval; and *Calyptrœa*, which has a spiral diaphragm within it, and is round and low-crowned, like a Chinaman's hat.

We may as well tabulate this cap-shaped thirteen:

- Oblong—
  - Pillar fold broad—*Testacella.*
  - Pillar fold indistinct—*Ancylus.*

- Beak twisted—
  - Mouth with septum—*Crepidula.*
  - Mouth without septum—*Capulus.*

- Shell slit—
  - Slit at crown—*Fissurella.*
  - Slit on margin—*Emarginula.*
  - Slit between crown and margin—*Puncturella.*

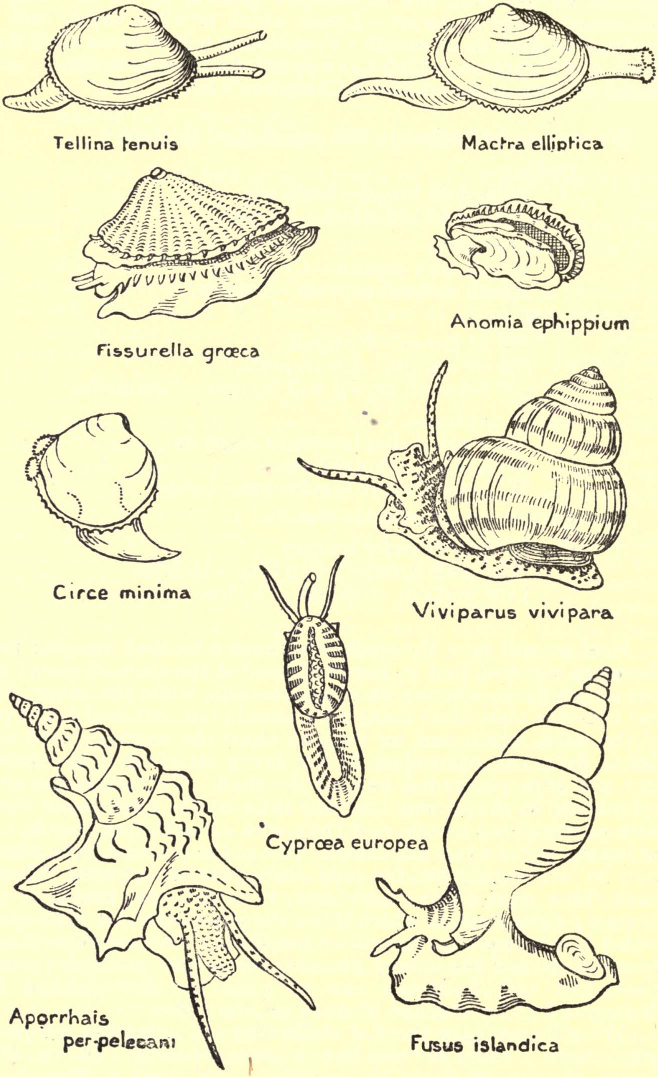
- Crown central—
  - With spiral diaphragm—*Calyptrœa.*
  - With shelf—*Propilidium.*
  - Without shelf or diaphragm—*Lepeta.*

- Crown nearly central—*Patella.*

- Crown near anterior margin—
  - High and streaked with blue—*Helcion.*
  - Low and not streaked—*Tectura.*

Next we will take the shells that have a toothed margin; two of these are sinistral, that is, have left-handed spirals, and one of them has a clausilium, whence its name *Clausilia*, while the other, *Balea*, has not—the clausilium being an internal plate attached to the pillar of the shell, which can be used to close the entrance, and which differs from the operculum in not being attached to the animal's foot and thus protruded beyond the shell. Two others are almost cylindrical in shape, and look like little beads, these being *Vertigo*, with an angulated mouth, and *Pupa*, with a mouth that may be ovate or lunate, but is never angulated. One of the Helices, *Helix obvoluta*, may be mentioned next, the only *Helix* that has a tooth. Then we have three oval shells—*Cochlicopa*, in which the mouth is pear-shaped; *Carychium*, in which it is obliquely oval; and *Melampus*, in which it is narrow and the pillar has folds. Of these, *Carychium* is transparent and the others are not, except one greenish variety of *Cochlicopa*, and *Cochlicopa* can at once be distinguished from *Melampus* by the absence of folds on the pillar.

We will now take the flat shells that are coiled like a rope on a ship's deck. Three of these have a circular mouth. In one, *Homalogvra*, the mouth clasps the periphery; in another, *Planorbis*, the mouth is thickened with a rib; and the other, *Valvata*, has no rib. The rest of the flat shells belong either to *Helix* or *Planorbis*; those with a mouth of four-fifths of a circle without a rib, or quadrangular



Tellina tenuis

Mactra elliptica

Fissurella grœca

Anomia ephippium

Circe minima

Viviparus vivipara

Cyprœa europea

Aporrhais per-pelecani

Fusus islandica

Living Shells.

or horseshoe-shaped, belong to *Helix*; the others with the mouth oval and oblique, or oval and angulated, or half-moon shaped with a rib, or two-thirds of a circle with rib, belong to *Planorbis*.

We can now attack the main body of the Gastropods—those whose shells are a raised spiral. From these we can at once pick out *Aporrhais*, which has the pillar projecting beyond the mouth, and the outer lip expanded into the winged or digitate process as broad as the diameter of the shell, so clearly shown in our illustration of living shells. And with it we can put *Cerithium* and *Cerithiopsis*, in which the pillar slightly projects, but the lip is not digitate, and which can be distinguished from each other by the basal groove, the first having it curved and the second having it straight. This leaves us with the holostomatous shells, in which the pillar does not extend beyond the mouth. Clearing off *Stilifer*, in which the apex is divided into two, *Truncatella*, in which it is broken off short, and *Scissurella*, in which there is a slit in the outer lip, we can make three groups of the rest:

Height less than breadth.
Height equal to breadth.
Height greater than breadth.

And sub-divide the last into:
More than double the breadth.
  Between double and treble.
  More than treble.
Less than double the breadth.

Those in which the height is less than the breadth comprise certain species of *Helix*, in which the mouth is semi-circular; *Cyclostrema*, in which it is nearly circular; *Vitrina*, in which the shell is thin and green; *Skenea*, in which it is thin and opaque, with a flexuous, projecting mouth; and *Zonites*, which is thin, transparent, shining, with an oblique mouth of the shape of a crescent. Add to them the two flat-based genera, *Adeorbis* and *Trochus*, the first of which is minute, and is further distinguishable by its waved lip, and we have all this batch which are broader than they are high. Briefly, they can be put as follows:

Base flat—
  Outer lip plain—*Trochus*.
  Outer lip waved—*Adeorbis*.

Base not flat—
  Thin and green—*Vitrina*.
  Mouth flexuous and projecting—*Skenea*.
  Mouth crescentic and oblique—*Zonites*.
  Mouth semi-lunar—*Helix*.
  Mouth almost circular—*Cyclostrema*.

In the next group, that which are as broad as they are long, if we take away *Ianthina*, unmistakable owing to its violet shell, we are left with six genera:

Base flat—*Trochus*.
Mouth circular—*Valvata*.
Pillar folded—*Limnæa*.
Pillar grooved—*Lacuna*.
Thick and heavy—*Littorina*.
Thin and light—*Helix*.

Those in which the height is greater than the breadth are not so easily disposed of. Some are between double and treble as long as they are broad, some more than treble as long. The longest in our list are *Odostomia*, *Eulima*, *Aclis*, *Turritella*, and *Scalaria*. The left-handed upper whorls distinguish *Odostomia; Eulima* is narrow and pointed as an awl, and highly polished; *Aclis* is smooth or faintly ridged and pyramidal in form; *Turritella* has bold spiral ridges, and *Scalaria* prominent longitudinal ribs, added to which *Turritella* is the longest narrow shell we have.

The next batch, those having the length between less than three times but more than twice the length, comprises *Odostomia*, with its sinistral upper whorls; *Limnæa*, with its folded pillar; *Bulimus*, with its reflected outer lip; and *Acicula*, with its reflected inner lip, *Acicula*, better known as *Acme*, being a land shell with an operculum. We can put the long eight under one heading to simplify matters:

Upper whorls sinistral—*Odostomia*.
Pillar folded—*Limnæa*.
Outer lip reflected—*Bulimus*.
Inner lip reflected—*Acicula*.
Subulate and polished—*Eulima*.
Smooth or faintly ridged—*Aclis*.
Spirally ridged—*Turritella*.
Longitudinally ribbed—*Scalaria*.

We are left with those longer than they are broad, but not twice so long as they are broad. These we can divide into those having the curve of the mouth broken into by the body whorl, and those in which it is not interfered with; in other words, those with an incomplete peristome and those with a complete peristome. The incomplete ones are *Limnæa*, *Bulimus* (as regards *obscurus*), *Neritina*, and *Jeffreysia*, whose differences can be thus summarised:

Pillar with fold—*Limnæa*.
Mouth like a horseshoe—*Bulimus*.
Shell thin, smooth and glossy—*Jeffreysia*.
Shell semi-globular, mouth semi-circular—*Neritina*.

Size alone will sort out *Jeffreysia*, as none of its three species are larger than the tenth of an inch, and the mouth of *Neritina* and the fold of *Limnæa* leave *Bulimus* conspicuously alone.

Those with peristome complete are more numerous. At the first glance we can pick out *Lacuna*, with its grooved pillar; *Physa*, with its left-handed shell; the amber-coloured *Succinea*, in which the mouth is more than half the shell's height; the richly variegated and polished *Phasianella;* and *Assiminea*, with its inner lip thick and outer lip thin. Seven genera are left. In two of these the shell is thin—*Bithynia*, which has a thick outer lip, and *Hydrobia*, which has a thin outer lip. In three the shell is moderately thick; one, *Cyclostoma*, having a nearly circular mouth, the other two being separable on size alone, *Rissoa* never exceeding half an inch, and *Viviparus*, otherwise *Paludina*, never measuring less than an inch. This reduces the seven to two in which the shell is particularly solid; and it is smooth in *Barleeia* and heavy and striated in *Littorina*, as everyone knows who has picked up a periwinkle.

With that we end the British gastropods having entire mouths, among whom are included all our land and fresh-water shells but one. That one is *Achatina acicula*, which can be distinguished from the rest of the notched group by its transparency. It is a diminutive species, not much more than an eighth of an inch long, and seldom found alive owing to its living underground among the roots of the trees and plants. It has no eyes, and its lower tentacles are only discoverable with difficulty as a pair of almost invisible knobs, and, with its thin white shell, is altogether a most unexpected representative of a genus which contains over 400 species, mostly African, including the largest of living land-snails, which is more than six inches in length.

Leaving the land for the sea, we can divide the non-transparent group into—

Shell convolute.
Shell with a long narrow mouth.
Shell with a curved canal.
Shell with a straight canal.

Those with a convolute shell are three in number, and in two of them the spire is hidden. These are *Ovula* and *Cypræa*, the cowry. In the cowry the outer lip is ribbed, in *Ovula* it is plain. Although we have thus brought them together, owing to their being convolute and having hidden upper whorls, their shape is very different, as can be seen in the illustrations; and the cowry is so well known that it would almost be sufficient to say that the pair consists of the cowry and another, for there is only one species of each. In one other convolute shell, *Marginella*, the spire is not turned in, but is very low. It looks like a cowry that had thought better of it, and is a singularly graceful little shell, bright and polished, and ribbed only on the outer lip, the rib being very faint. As with the other two, we have only one species of the genus, that being *lævis*. Briefly then we have:

Shell convolute—
    Spire not hidden—*Marginella*.
    Spire hidden.
        Outer lip plain—*Ovula*.
        Outer lip ribbed—*Cypræa*.

In the remainder of our shells the lip is not turned inwards. Three of the genera are spindle-shaped, and have a long, narrow mouth. In one the mouth is smooth, in another it is grooved, in the other it is ridged. In the first the outer lip is notched, in the last it is curved. This will serve to distinguish them, thus:

Mouth smooth, outer lip notched in the middle—*Pleurotoma.*
Mouth grooved, outer lip notched at top—*Mangilia.*
Mouth ridged, outer lip curved—*Lachesis.*

In this triad, the slit in the mouth ought to mark off the two first at once, but the writer has not been fortunate enough to find it always in *Mangilia*, and only once or twice in *Pleurotoma*; doubtless it was there, but it was too faint to talk about, in some specimens at all events. In *Mangilia* it comes just where the lip joins the periphery. In both genera, as usually figured, it is unmistakable. *Lachesis* has a shorter mouth than the other two, and is a heavier, clumsier sort of shell about the same size, easily distinguished from the others by its thick mouth. *Mangilia*, it may be as well to say, is quite as well known as *Defrancia*, and is as often spelt *Mangelia*, a name which was at one time applied to *Pleurotoma*.

In our next two groups the mouth is broken by a long notch, which may be called a canal. In some cases this canal is curved, in others it is straight. It is curved in four genera, *Columbella*, *Nassa*, *Buccinum*, and *Buccinopsis*. Of these the first can be recognised by the fold at the base of the pillar, and by the curious projection of the outer lip alongside the notch. *Nassa* has the curvature of the canal distinctly shown, and has a characteristic tooth or teeth at the base of the pillar. In the other two genera the pillar is smooth, the difference being that in one, *Buccinum*, the whelk, the shell is coarsely ribbed; in the other, *Buccinopsis*, very like a whelk, the shell is finely striated. Putting them into form, we have:

Shell with curved canal—
    Pillar folded at base—*Columbella.*
    Pillar toothed at base—*Nassa.*

    Pillar smooth—
        Coarsely ribbed—*Buccinum.*
        Finely striated—*Buccinopsis.*

There are five genera in which the canal is straight, and in one of these, *Murex*, it is covered in so as to form a tube. *Murex* can be identified at a glance by this tubular canal. Of the four with the canal open, one, *Triton*, has the pillar with folds or tubercles, and the shell is coarsely ribbed with very prominent varices. Both species are large, being two or three inches long, and both are rare as British specimens, and appear in our list as being found in the Channel Islands. Among shells in general they are as well known as any, being as old as Neptune, however old that may be, that sea-god having used them before his trumpeter died.

The three in which the pillar is smooth can be sorted out as those in which the canal is long and those in which it is short. It is long in *Fusus*, the large smooth whelk, and in *Trophon*, and it is short in *Purpura*. *Purpura lapillus*, the dog-whelk, is a massive little shell, not unlike a periwinkle in its typical form, with an oval mouth and thin, deeply-cut, short canal. Periwinkles vary, and so do dog-whelks; in fact, the variations of the latter are so numerous as to be nameless, and, in some cases, unrecognisable as belonging to the species in the absence of the intermediate forms. The other *Purpura* is a much more gentlemanly shell, and is of graceful build, with a rich orange mouth ending in a shorter canal than *lapillus*.

Though *Trophon* has prominent ribs, and *Fusus* has not, the readiest means of distinguishing between them is by their size. *Trophon* is never over an inch in length, *Fusus* is never under an inch, and in some species runs up to five inches. The specimen of *Fusus antiquus* figured in the coloured plate, which is of the variety *alba*, is just five inches long, and the smallest species, *propinquus*, with the turreted spire, is well over an inch and a half. Let us note this further step in the usual form:

Canal straight and open—
    Pillar folded or tuberculated—*Triton*.
    Pillar smooth.
        Canal short—*Purpura*.

        Canal long.
            Shell under an inch—*Trophon*.
            Shell over an inch—*Fusus*.

We have only two genera left, both represented by only one species, and both belonging to the same family, though very unlike in appearance, and being the only British representatives of that family. They are brought together here simply because in each case the shell has an indistinct notch, which prevented them being dealt with in our first series. The first, *Trichotropis*, is pointed at both ends, with a mouth expanding upwards, and has prominent spiral ribs that are cut across by thread-like striations; the other, *Torellia*, is not unlike a rounded periwinkle in shape, with a mouth expanding downwards, and having no ribs, but being finely striated in both directions. With *Torellia* we have the last of the eighteen British genera that have the mouth interrupted by a notch or canal.

This is not all the British shells. There is another series among the opisthobranchs, some of which have shells, while others have not. In three genera, *Philine*, *Aplysia*, and *Pleurobranchus*, the shells are ear-shaped and very thin; in *Philine* the shell is white, in *Aplysia* it is broad, horny, and glossy, in *Pleurobranchus* it is broad and iridescent. In two genera it is convolute, *Cylichna* having the spire hidden, and *Tornatinus*, otherwise *Utriculus*, having the spire exposed. In two species the shell is almost convolute, these being *Scaphander*, with it spirally striated, and *Acera*, with it swollen and thin. In two cases the shell is oval in general outline, these being *Actæon*, in which it is spirally striated, and *Bulla*, in which the spire is involute. Both *Actæon* and *Scaphander* have substantial shells of ordinary appearance, though, in the case of *Scaphander*, of peculiar shape; those of *Acera* and *Bulla* are not unlike that of *Limnæa* in colour and material; those of *Cylichna* and *Tornatinus* are small and distinctive; those of *Philine*, *Aplysia*, and *Pleurobranchus* are mere membranes. The sea-slugs have no shells, and, as in their case it is not worth going over the same ground twice, we will leave their points of identification to be dealt with under their families and genera further on.

The land-slugs have shells, but they are internal and rudimentary, and dwindle down to a few granules, to show that a shell was possessed by distant ancestors. The easiest way to identify the slugs is by their breathing aperture. In *Geomalacus*, the spotted slug hailing from the south-west of Ireland, which is the connecting link between *Limax* and *Arion*, the aperture is near the front of the shield. In *Arion* it is in the middle of the shield. In *Limax* and *Amalia*, a genus formerly included with *Limax*, it is near the back of the shield, *Amalia* having the mantle granulated, *Limax* having it striated. If you are in doubt as to which is the mantle, you have only to irritate a *Limax* to see him duck his head under his mantle, or catch him asleep, when you will find he has put his mantle over his head to make himself comfortable.

It will be noticed that we have grouped our land slugs under five genera—*Testacella*, *Amalia*, *Limax*, *Arion*, and *Geomalacus*; and of these genera recorded seventeen species. Had we included varieties we should have had fifty more figures, and even then we should not have illustrated them all or made clear the difference between them. Had we given the varieties of all the species, marine and non-marine, we should have required two thousand illustrations, to include only those distinctive enough to be worth regarding.

Among the molluscs it is more difficult than usual to draw the line between a variety and a species, or even between one variety and another. Several of the species are old varieties promoted to the higher rank, and, as a rule, it is desirable to keep new forms among the rank and file until the reasons for their promotion are strong enough to satisfy the reasonable. As instances of promotion, we have *Helix hortensis*, looked upon for years as a variety of *Helix nemoralis*, and as an example of the intermediate stage, we have *Testacella scutulum*, accepted as a species by some, and retained by others in its old place as a variety of *Testacella haliotidea*.

Varieties are the general collector's horror and the specialist's delight. To have dealt with them in this book would have made it too heavy in two senses, and so we restricted it to the species only, and we have also simplified the path of identification by keeping clear of sub-genera, which are rather as luxuries than necessities. Dealing with one country's fauna, as we do, the old genera are not too large for our purpose; but dealing with the world's fauna, such a genus as *Helix*, for instance, becomes too crowded with species to be wieldy, and the species sort themselves into unmistakable groups for which a collective name is manifestly a convenience. Such names have, consequently, been adopted, and, in due course, have found their way into our local lists. They would be used in all cases if there were any indications of permanence amongst them, but of the making of sub-genera, as of the making of species, there seems to be no end. Hence the generic name is usually retained, and the species arranged in groups under the sub-generics. Occasionally the generics are dropped, and the collector finds himself confronted with names unknown to him that he can find no mention of in his books, and which in some cases appear to have been suggested mainly for the sake of the little advertisement in brackets that it is hoped they will always carry with them.

But synonymy is inevitable, and there is no good in girding at it. It is a large matter, and, as a complete synonymy of our mollusca would probably have filled all our pages, it is here impossible; but as a help in times of trouble we may find space for the following short working list of some of the more recent synonyms of the British pulmonates:

Acanthinula aculeata—Helix aculeata, 263.
Acanthinula lamellata—Helix lamellata, 274.
Agriolimax agrestis—Limax agrestis, 235.
Agriolimax lævis—Limax lævis, 236.
Alinda biplicata—Clausilia biplicata, 504.
Alœa alpestris—Vertigo alpestris, 292.
Alœa antivertigo—Vertigo antivertigo, 294.
Alœa moulinsiana—Vertigo moulinsiana, 298.
Alœa pygmæa—Vertigo pygmæa, 500.
Alœa substriata—Vertigo substriata, 501.
Amalia sowerbyi—Amalia marginata, 233.
Amphipeplea glutinosa—Limnæa glutinosa, 209.
Aplexa hypnorum—Physa hypnorum, 229.
Arianta arbustorum—Helix arbustorum, 264.
Arion circumscriptus—Arion bourguignati, 242.
Azeca tridens—Cochlicopa tridens, 311.
Bathyomphalus contortus—Planorbis contortus, 218.
Buliminus montanus—Bulimus montanus, 261.
Buliminus obscurus—Bulimus obscurus, 262.
Chilotrema lapicida—Helix lapicida, 275.
Clausilia bidentata—Clausilia rugosa, 307.
Cochlicella acuta—Bulimus acutus, 259.
Cœcilioides acicula—Achatina acicula, 312.
Conulus fulva—Zonites fulvus, 253.
Coretus corneus—Planorbis corneus, 219.
Fruticola cantiana—Helix cantiana, 266.
Fruticola cartusiana—Helix cartusiana, 268.
Fruticola fusca—Helix fusca, 271.
Fruticola granulata—Helix sericea, 286.
Fruticola hispida—Helix hispida, 272.
Fruticola revelata—Helix revelata, 282.
Fruticola rufescens—Helix rufescens, 284.
Gonostoma obvoluta—Helix obvoluta, 277.
Gyraulus albus—Planorbis albus, 215.
Gyraulus dilatatus—Planorbis dilatatus, 220.
Gyraulus nautileus—Planorbis nautileus, 223.
Gyraulus parvus—Planorbis glaber, 221.
Gyrorbis carinatus—Planorbis carinatus, 216.
Gyrorbis complanatus—Planorbis complanatus, 217.
Gyrorbis spirorbis—Planorbis spirorbis, 225.

Gyrorbis vortex—Planorbis vortex, 226.
Helix granulata—Helix sericea, 286.
Helix itala—Helix ericetorum, 270.
Hippeutis nitidus—Planorbis nitidus, 224.
Hyalinia alliaria—Zonites alliarius, 249.
Hyalinia cellaria—Zonites cellarius, 250.
Hyalinia crystallina—Zonites crystallinus, 251.
Hyalinia draparnaldi—Zonites draparnaldi, 248.
Hyalinia excavata—Zonites excavatus, 252.
Hyalinia fulva—Zonites fulvus, 253.
Hyalinia glabra—Zonites glaber, 254.
Hyalinia nitidula—Zonites nitidulus, 256.
Hyalinia nitida—Zonites nitidus, 255.
Hyalinia pura—Zonites purus, 257.
Hyalinia radiatula—Zonites radiatulus, 258.
Isthmia minutissima—Vertigo minutissima, 297.
Lauria anglica—Pupa ringens, 289.
Lauria cylindracea—Pupa umbilicata, 291.
Limax marginatus—Limax arborum, 238.
Lymnophysa palustris—Limnæa palustris, 211.
Lymnophysa stagnalis—Limnæa stagnalis, 213.
Lymnophysa truncatula—Limnæa truncatula, 214.
Marpessa laminata—Clausilia laminata, 505.
Patula rotundata—Helix rotundata, 283.
Patula rupestris—Helix rupestris, 285.
Pirostoma bidentata—Clausilia rugosa, 307.
Pirostoma rolphii—Clausilia rolphii, 306.
Polita draparnaldi—Zonites draparnaldi, 248.
Polita glabra—Zonites glaber, 254.
Polita nitidula—Zonites nitidulus, 256.
Polita pura—Zonites purus, 257.
Polita radiatula—Zonites radiatulus, 258.
Pomatia aspersa—Helix aspersa, 265.
Pomatia pomatia—Helix pomatia, 279.
Punctum pygmæa—Helix pygmæa, 281.
Pupa anglica—Pupa ringens, 289.
Pupa cylindracea—Pupa umbilicata, 291.
Pupa muscorum—Pupa marginata, 288.
Pupilla muscorum—Pupa marginata, 288.
Radix auricularia—Limnæa auricularia, 207.
Radix involuta—Limnæa involuta, 210.
Radix peregra—Limnæa peregra, 212.
Segmentina nitida—Planorbis lineatus, 222.
Sphœradium edentula—Vertigo edentula, 295.
Tachea hortensis—Helix hortensis, 273.
Tachea nemoralis—Helix nemoralis, 276.
Torquilla secale—Pupa secale, 290.
Vallonia pulchella—Helix pulchella, 280.
Velletia lacustris—Ancylus lacustris, 205.
Vertilla angustior—Vertigo angustior, 293.
Vertilla pusilla—Vertigo pusilla, 299.
Vitrea crystallina—Zonites crystallinus, 251.
Xerophila caperata—Helix caperata, 267.

Xerophila itala—Helix ericetorum, 270.
Xerophila pisana—Helix pisana, 278.
Xerophila virgata—Helix virgata, 287.

One more list, in conclusion. The following genera are non-marine—that is, are either land or fresh-water. In our list of illustrations their names are set a quarter of an inch in, so as to distinguish them at a glance from the sea-shells:

Pelecypoda—
  Anodonta, 58, 59.
  Dreissensia, 60.
  Pisidium, 85 to 89.
  Sphærium, 81 to 84.
  Unio, 55 to 57.

Gastropoda.
  Achatina, 312.
  Acicula, 398.
  Amalia, 232, 233.
  Ancylus, 205, 206.
  Arion, 241 to 245.
  Balea, 303.
  Bithynia, 430, 431.
  Bulimus, 259 to 262.
  Carychium, 201.
  Clausilia, 304 to 309.
  Cochlicopa, 310, 311.
  Cyclostoma, 397.
  Geomalacus, 246.
  Helix, 263 to 287.
  Hydrobia—
    as regards *Hydrobia similis*, 427,
      and *Hydrobia ventrosa*, 428.
  Limax, 234 to 240.
  Limnæa, 207 to 214.
  Neritina, 356.
  Physa, 227 to 229.
  Planorbis, 215 to 226.
  Pupa, 288 to 291.
  Succinea, 313 to 317.
  Testacella, 230, 231.
  Valvata, 441, 442.
  Vertigo, 292 to 302.
  Vitrina, 247.
  Viviparus, 439, 440.
  Zonites, 248 to 258.

CHAPTER VI.

TABULAR SCHEME.

RETAINING the arrangement with which we began, we will put the bivalves first, and begin with the Pholadacea :

- Shell with dorsal pieces and apophyses—
  - Apophyses long—
    - Shell prickly all over—*Pholas*, 160-163.
    - Shell prickly only at fore end and with cup at posterior end—*Pholadidea*, 164.
  - Apophyses short—*Xylophaga*, 165.
- Shell continued into a calcareous tube with long siphons, having a pair of calcareous pallets near the end—*Teredo*, 166-171.

We can then tabulate the group as follows:

A. Pallial line not indented ; no siphons—

- Shell inequivalve—
  - Equilateral or nearly so—
    - With ears—*Pecten*, 33-43.
    - Without ears—
      - With orifice in lower valve—*Anomia*, 9, 10.
      - Without orifice—*Ostrea*, 32.
  - Very oblique—
    - With teeth—*Avicula*, 30.
    - Without teeth—*Pinna*, 31.
- Shell equivalve—
  - With ears—
    - Hinge toothless ; one muscular scar—*Lima*, 44-48.
    - Hinge with teeth ; two muscular scars—*Limopsis*, 17, 18.
  - Without ears—
    - Hinge with many teeth—
      - Hinge straight—*Arca*, 11-15.
      - Hinge curved—
        - Shell round, teeth in two groups—*Pectunculus*, 16.
        - Shell elongated at posterior end, teeth on each side nearly equal—*Leda*, 5-8.
        - Shell trigonal, teeth much more numerous on posterior side—*Nucula*, 1-4.

Hinge with few or no teeth—
  Shell almost circular—*Axinus*, 66-68.

  Shell inequilateral—
    Ligament external and large—
      Teeth conspicuous—*Unio*, 55-57.
      Teeth inconspicuous —*Anodonta*, 58, 59.

    Ligament internal—
      With radial ribs, transverse plates, and one upright tooth; hinge margin crenulated behind the ligament—*Crenella*, 24, 25.
      With two groups of striæ from beaks—*Modiolaria*, 26-29.

    Beaks terminal and pointed—
      With shelf within the beak—*Dreissensia*, 60.
      Without shelf—*Mytilus*, 19-23.

B. Pallial line not indented; siphons short—

  Grooves radial—*Cardium*, 129-138.

  Grooves concentric—
    Beaks twisted—*Isocardia*, 54.

    Beaks not twisted—
      Hinge without teeth—*Galeomma*, 80.

      Hinge with teeth—
        Shell oblong—*Lepton*, 76-79.

        Shell triangular—
          Two teeth in each valve—*Astarte*, 50-52.
          Three teeth in each valve, one cloven so as to make the three look like four—*Circe*, 113.

        Shell circular or sub-orbicular—
          Ligament or cartilage internal—
            Anterior scar long and extending within pallial line—*Loripes*, 63, 64.
            Anterior scar orbicular—*Montacuta*, 69-72.

            Anterior scar oval—
              Left cardinal small—*Lasæa*, 75.
              Left cardinal thick and erect—*Kellia*, 73, 74.

          Ligament more or less external—
            Shell circular; two teeth in each valve, anterior in left and posterior in right, being bifid; ligament double—*Diplodonta*, 65.

- Ligament conspicuous—
  - Rising above level of dorsal line—*Cyamium*, 49.
  - Partially overlapped in a groove—
    - Anterior scar narrow and projecting far within pallial line—*Lucina*, 61, 62.
    - Shell thick, large and heavy, scars oval and shiny—*Cyprina*, 53.
- Ligament inconspicuous, shell horny and translucent—
  - Beak at fore end—*Pisidium*, 85-89.
  - Beak midway—*Sphærium*, 81-84.

C. Pallial line indented, siphons long—

- Shell inequivalve—
  - Nearly equilateral, ligament in internal groove—*Lyonsia*, 173.
  - Elongated at hinder end—*Pandora*, 172.
  - Truncated at hinder end—
    - Hinge with ossicle—*Thracia*, 174-178.
    - Hinge without ossicle, cartilage in cavity of cardinal—*Corbula*, 146.
- Shell equivalve—
  - Gaping at both ends—
    - Shell long and narrow—
      - Hinge nearly midway, with radiating ribs—*Ceratisolen*, 151.
      - Hinge terminal, one cardinal in right valve—*Solen*, 152-155.
      - Hinge sub-terminal, two cardinals in right valve—*Solecurtus*, 149, 150.
    - Shell oblong and very oblique—*Lutraria*, 147, 148.
    - Shell broad with a broad, short shelf—*Mya*, 7.
  - Gaping posteriorly—
    - Beaks turned towards hinder end — *Scrobicularia*, 99-103.
    - Shell striated radially and concentrically—*Psammobia*, 139-142.
    - Shell with long, calcareous sheath—*Gastrochæna*, 159.
    - Shell with wrinkled periostracum extending over siphons—*Mya* (as regards *binghami*, 145).
    - Shell elongated, thin and prickly—*Petricola*, 128.
    - Shell with thin, concentric plates—*Venerupis*, 127.
    - Shell obliquely truncated at hinder end—
      - Pallial line continuous—*Panopæa*, 158.
      - Pallial line broken up—*Saxicava*, 156, 157.

Cartilage in triangular cavity under each beak—
  Shell with hinder end elongated—*Neæra*, 180-183.
  Shell oval—*Poromya*, 179.

Not gaping at either end—
  Ligament partly external, partly internal—
    Teeth unequal in both valves—*Mactra*, 108-112.
    Teeth unequal in right valve only—*Amphidesma*, 107.

  Ligament wholly external—
    Teeth two in right valve—
      Inside margins notched—*Donax*, 104-106.

      Inside margins not notched—
        Teeth in left valve equal—
          Shell as broad as long—*Lucinopsis*, 122.
          Shell not so broad as long—*Tellina*, 90-97.
        Teeth in left valve unequal—*Gastrana*, 98.

    Teeth three in both valves—
        Sinus rounded—*Tapes*, 123-126.
        Sinus angular—*Venus*, 114-121.

The bivalves being thus cleared from the path, we can take the other molluscs together—

Mouth of shell without groove or canal—
  Shell multivalve—*Chiton*, 190-200.

  Shell tubular—
    Pointed—*Dentalium*, 187-189.
    Not pointed—*Cæcum*, 453, 454.

  Shell globular—*Natica*, 370-376.

  Shell ear-shaped—
    Lip perforated—*Haliotis*, 333.

    Lip not perforated—
      Whorls two—*Otina*, 204.

      Whorls more than two—
        Very thin and transparent—
          First whorl twisted—*Lamellaria*, 377.

        Rather thin and opaque—
          First whorl not twisted—*Velutina*, 378, 379.

  Shell cap-shaped—
    Oblong and solid, pillar fold broad—*Testacella*, 230, 231.
    Oblong and thin—*Ancylus*, 205, 206.

    Beak twisted and curled—
      Mouth with septum—*Crepidula*, 384.
      Mouth plain—*Capulus*, 382.

Slit at crown—*Fissurella*, 326, 327.
Slit on anterior margin—*Emarginula*, 329-332.
Slit between crown and margin—*Puncturella*, 328.

Crown near front margin—
  Streaked with blue—*Helcion*, 325.
  Not streaked with blue—*Tectura*, 319-321.

Crown almost central—*Patella*, 324.

Crown quite central—
  Without shelf—*Lepeta*, 322.
  With triangular shelf—*Propilidium*, 323.
  With spiral diaphragm—*Calyptræa*, 383.

Shell toothed—

Sinistral—
  Mouth with clausilium—*Clausilia*, 304-309.
  Mouth ovate—*Balea*, 303.

Cylindrical—
  Mouth ovate or lunate—*Pupa*, 288-291.
  Mouth angular—*Vertigo*, 292-302.

Depressed—*Helix* (*obvoluta*), 277.

Oval—
  Mouth pyriform—*Cochlicopa*, 310, 311.
  Mouth obliquely oval, shell transparent—*Carychium*, 201.
  Mouth narrow, pillar with folds—*Melampus*, 202, 203.

Shell coiled flat—

Mouth circular—
  Without rib—*Valvata*, 441, 442.
  Clasping periphery—*Homalogyra*, 385, 386.
  Thickened with rib—*Planorbis*, 216-218, 225, 226.

Mouth oval and oblique, or
  Oval and angulated, or
  Semilunar with rib, or
  Two-thirds of a circle with rib—*Planorbis*, 215-226.

Mouth four-fifths of a circle, without rib, or
  Quadrangular, or
  Horseshoe-shaped—*Helix*, 263-287.

Shell a raised spiral—

Pillar projecting beyond mouth—
  Outer lip digitate—*Aporrhais*, 455, 456.

  Outer lip not digitate—
    Basal groove curved—*Cerithium*, 443-446.
    Basal groove straight—*Cerithiopsis*, 447-451.

Pillar not projecting—
  Apex divided into two—*Stilifer*, 467.
  Apex broken off short—*Truncatella*, 399.
  Outer lip slit—*Scissurella*, 334.

Height less than breadth—
  Mouth almost circular—*Cyclostrema*, 335-337.
  Thin and green—*Vitrina*, 247.
  Thin and opaque, mouth flexuous and projecting—*Skenea*, 434.
  Thin, transparent and shining, mouth obliquely crescentic—*Zonites*, 248-258.
  Mouth semilunar—*Helix*, 263-287.

  Base flat—
    Outer lip waved—*Adeorbis*, 438.
    Outer lip plain—*Trochus*, 338-354.

Height equal to breadth—
  Shell purple—*Ianthina*, 357-359.
    Shell conical with flat base—*Trochus*, 338-354.
      Pillar folded—*Limnœa*, 207-214.
      Pillar grooved—*Lacuna*, 392-396.
      Shell thick and heavy—*Littorina*, 387-391.
      Shell thin and light—*Helix*, 263-287.
      Mouth circular—*Valvata*, 441, 442.

Height more than double the breadth—
  Between double and treble the breadth—
    Pillar folded—*Limnœa*, 207-214.
    Outer lip reflected (land shell)—*Bulimus*, 259-262.
    Inner lip reflected (land shell)—*Acicula*, 398.
    Upper whorls sinistral—*Odostomia*, 468-502.

Height over treble the breadth—
    Upper whorls sinistral—*Odostomia*, 468-502.
    Subulate and polished—*Eulima*, 461-466.

    Pyramidal—
      Smooth or faintly ridged—*Aclis*, 365-369.
      With bold spiral ridges—*Turritella*, 452.
      With bold longitudinal ribs—*Scalaria*, 360-364.

Height less than double the breadth—
  Peristome incomplete—
    Shell thin, smooth, and glossy—*Jeffreysia*, 435-437.
    Shell semi-globular, mouth semi-circular—*Neritina*, 356.
    Mouth horseshoe-shaped—*Bulimus* (*obscurus*), 262.
    Pillar with fold—*Limnœa*, 207-214.

  Peristome complete—
    Pillar with groove—*Lacuna*, 392-396.
    Sinistral—*Physa*, 227-229.
    Amber-coloured, mouth more than half the height of the shell—*Succinea*, 313-317.
    Richly variegated and polished—*Phasianella*, 355.
    Inner lip thick, outer lip sharp—*Assiminea*, 432, 433.

- Shell thin—
  - Outer lip thick—*Bithynia*, 430, 431.
  - Outer lip thin—*Hydrobia*, 426-429.
- Shell moderately thick—
  - Length over an inch—*Viviparus*, 439, 440.
  - Length under half-an-inch—*Rissoa*, 400-424.
  - Mouth nearly circular—*Cyclostoma*, 397.
- Shell solid and smooth—*Barleeia*, 425.
- Shell solid, heavy, and striated—*Littorina*, 387-391.

- Mouth grooved or with a canal—
  - Shell transparent—*Achatina*, 312.
  - Shell not transparent—
    - Shell convolute—
      - Spire hidden—
        - Outer lip plain—*Ovula*, 458.
        - Outer lip ribbed—*Cypræa*, 457.
      - Spire not hidden—*Marginella*, 529.
    - Shell fusiform with long narrow mouth—
      - Mouth smooth, outer lip notched—*Pleurotoma*, 536-549.
      - Mouth grooved—*Mangilia*, 530-535.
      - Mouth ridged, outer lip curved—*Lachesis*, 510.
    - Shell with a curved canal—
      - Pillar with fold at base—*Columbella*, 511, 512.
      - Pillar with tooth at base—*Nassa*, 513-516.
      - Pillar smooth—
        - Coarsely ribbed—*Buccinum*, 517, 518.
        - Finely striated—*Buccinopsis*, 519.
    - Shell with straight canal—
      - Canal covered—*Murex*, 506, 507.
      - Canal open—
        - Pillar smooth—
          - Canal long—
            - Shell measuring over an inch—*Fusus*, 520-528.
            - under an inch—*Trophon*, 503-505.
          - Canal short—*Purpura*, 508, 509.
        - Pillar folded or tuberculated—
          - Shell with disconnected varices—*Triton*, 459, 460.
    - Mouth with merely an indistinct notch—
      - Shell without longitudinal ribs, cavity at base of pillar—*Trichotropis*, 380.
      - Shell without ribs, globose and finely striated—*Torellia*, 381.

This tabulation does not include the slugs, which can be sorted out as follows:

Breathing hole near front of shield—*Geomalacus*, 246.
Breathing hole half way along shield—*Arion*, 241-245.
Breathing hole near back of shield—
  Shield shagreened—*Amalia*, 232, 233.
  Shield concentrically wrinkled—*Limax*, 234-240.

No breathing hole—*Onchidium*, 318.

The shell-bearing opisthobranchs also require a table to themselves, the nudibranchs and other sea-slugs being sufficiently sorted out in the systematic chapters further on.

Shell convolute—
  Spire exposed—*Tornatinus*, 551-557.
  Spire hidden—*Cylichna*, 560-564.

Shell incompletely convolute—
  Pyriform, spirally striated—*Scaphander*, 558, 559.
  Tumid, thin—*Acera*, 568.

Oval—
  Spirally striated—*Actæon*, 550.
  Spire involute—*Bulla*, 565-567.

Ear-shaped—
  Thin and white—*Philine*, 569-576.
  Thin, broad, horny, and glossy—*Aplysia*, 577-579.
  Thin, broad, and iridescent—*Pleurobranchus*, 580, 581.

CHAPTER VII.

IDENTIFICATION.

SOME shells are recognisable at a glance. No one is likely to make a mistake with regard to *Donax trunculus* and its square end, *Donax politus* and its white ray, *Isocardia* and its curly beaks, the round *Pectunculus*, the fan-like *Pinna*, the ear-shaped *Haliotis*, or the only British cowry. With some of the genera, too, the forms are unmistakable. The armadillo-like Chitons, the long Solens, are as distinctive as can be wished, and it would require peculiar perversity to go wrong with regard to an *Ianthina* or an *Aporrhais*. But with the majority of shells the distinguishing even of the genus is by no means so easy, and it can only be arrived at by some such system of elimination, conscious or unconscious, as we have adopted.

To show how the foregoing keys are worked let us take a shell—a bivalve to begin with. It is an every-day sort of specimen picked up on the beach, and its valves fell apart the instant they were touched, as in dead shells they so often do.

There is nothing peculiar about its back; there are no plates across where the hinge should be and no white fingers projecting inside from under the beaks; in no way could it be said to resemble a *Pholas*. It is just an ordinary, straightaway shell.

Its pallial line, which is about as visible as that made by a slug, is indented sharply, so that we can at once betake ourselves to Section C. The valves are equal in every respect; that gives us a further lift. The shell does not gape at all; that takes us a long way on. All the ligament is outside, there are three teeth in both valves, the sinus is angular, and, therefore, the genus is *Venus*. But *Venus* what? Turn to the chapter in which the genera are divided into species. Of *Venus* there are eight species. Three of these—which belonged to the old genus *Cytherea*—have the inside edge of the margin plain. An examination with the magnifying glass shows our specimen to be finely toothed, the pattern being that which can be made on pastry with a fork. The pattern does not extend along the posterior side, consequently the species is not *ovata*. It has not the fine striations and fan-like rays of *gallina*, nor the thick ribs and white mouth of *verrucosa*, nor the broad thin plates and mealy look of *casina*; but it has flat concentric ribs and is pinkish with darker pink rays, and is, in fact, the only species left—*fasciata*—and could have been at once identified by its size had we felt inclined to take it that way.

Yet one more to be introduced to by name. The shell is decidedly equivalve, but outrageously equilateral. It has no ears and only a sort of apology for a tooth. Its ligament is internal, so that if it is in the A division at all it must be in the last group. It has no radial ribs, and is, consequently, neither *Crenella* nor *Modiolaria*, but it has a pointed terminal beak, and the shelf inside under the beak distinguishes it as *Dreissensia*, the fresh water mussel, its neighbour in this tabulation, *Mytilus*, the salt water mussel, having no shelf. As it is represented by only one species we have no further to go.

Let us have an instance which will take us beyond Division A. Here is a fine, large, well-shaped shell with a splendid hinge that ought to locate it at once, but does not. The shell is equivalve, without ears, with few teeth, inequilateral, and with ligament external; that is clearly neither an *Anodonta* nor a *Unio*. What is it? Let us go on to Division B. Its grooves are concentric, its beaks are not twisted, its ligament is external, as we have seen, and it is conspicuous and is partially overlapped in a groove. The anterior muscle scar does not project within the pallial line; and thus we are left at *Cyprina*, the only British representative of the *Cyprinidæ*, which has only one species, *islandica*.

And now let us deal with a specimen the other way round. Here is another shell. It has been brought in to us with the animal in it. Being a bivalve we at once refer to the Pelecypoda to see to what order it belongs. A rough dissection shows us that the gill filaments are not divergent, that they are not parallel, that they are not loosely connected, but that they are bound into plates. This is enough to show that our specimen is one of the Eulamellibranchiata, and we have then to place it in its family.

It is unfortunate that there should be so many families in the order, but after reading the notes as to some of the likely ones we try the last in alphabetical order and find that it answers fairly well. Its shell is regular and solid, its hinge has three large diverging cardinal teeth, its ligament is external, its adductor scars are oval and clear, and the pallial line has a particularly bold indentation. Evidently we have one of the Veneridæ to deal with.

But the Veneridæ are represented in British waters by five genera; to which of them is it assignable? To begin with, it has unmistakably three cardinal teeth in each valve. This relieves us of *Lucinopsis*, which has only two cardinals in the left valve. Neither of the six teeth is distinctly cloven, though there is just a trace of a beginning of division. This allows us to pass *Circe*, which has the posterior cardinal in the left valve cut in two. It has no well-marked concentric plates, only concentric ridges, and so it cannot be *Venerupis*, thus it must either be *Venus* or *Tapes*, and as *Venus* has an angular sinus in the pallial line, while this specimen has a distinctly marked line with a deep well-rounded bay, we have no difficulty in declaring its genus to be *Tapes*.

We may as well find its species. It is concentrically striated, and consequently can be neither *decussatus*, in which the striations are radial and strong, nor *pullastra*, in which the striations are radial and faint. It must be *aureus* or *virgineus*, and being rayed and spotted with reddish brown, instead of being streaked and blotched with brown and purple, it is evidently the latter. *Tapes virgineus* it is. Some reader may ask what is its other name? The answer is that we do not know that it has another.

Combining our information, we find that the shell is equivalve, inequilateral, yellowish in colour, rayed and spotted with reddish brown, concentrically striated, the hinge having three cardinal teeth in each valve, the pallial line having a deep rounded sinus, and the muscular scars being oval. It would not take long to arrive at the genus by way of our key, for the indented pallial line takes us at once to the C division, the equivalve shell gives us another long step, the not gaping at either end another, and the ligament wholly external with the three teeth in both valves land us in either *Tapes* or *Venus*, which are separable by the shape of the indentations in the pallial line.

Let us take another shell by the key. It is equivalve, but its valves are of a curious shape and prickly, and have a sort of plate on the back, with two arms stretching out into the interior from where the valves join. The shell, in fact, has dorsal pieces and apophyses, and the apophyses are long. As it is prickly all over, the genus is at once apparent as *Pholas*. Taking it the other way round we find the Pholadidæ to have a shell gaping at both ends without hinge or ligament, with one or more accessory dorsal pieces an internal apophysis from each beak cavity and the dorsal margin reflected over the beaks. There are three British genera in the family —*Xylophaga*, with short apophyses, and the two others with long, and of these *Pholadidea* has prickly ridges in the fore part, and *Pholas* is prickly all over. *Pholas*, it will be found, has four species, one of which, *dactylus*, has four shields, the others having one, and of these *candida* has radiating ribs, *parva* transverse ribs, and *crispata* longitudinal ribs. *Pholadidea* has only one species, and that has two dorsal shields, so that the prickliness is not the only guide.

One more bivalve. Its pallial line is not indented, its shell is equivalve, it has no ears, and it has many teeth. This stops us early. If the hinge is straight, the genus is *Arca*; but the hinge is curved, then it is either *Pectunculus*, *Leda*, or *Nucula*. The shell is practically circular and the teeth are in two groups, one on each side of the beak; that is the sign of *Pectunculus* and no other. *Pectunculus* it is, and turning to the species we find there is only one, *glycimeris*, and that the genus belongs to the Arcadæ, which in their turn belong to the Filibranchiates, of which we have only three families—Anomiidæ, Arcadæ, and Mytilidæ. These three are strangely unlike: the Mytilidæ being the mussels, the Anomiidæ being the oyster-like mollusc with the large hole in the under valve through which the byssus passes, and the Arcadæ being made up of *Arca*, *Pectunculus*, and *Limopsis*, all of which have the many-toothed hinge.

Now let us take a gastropod, and let it be a fair-sized specimen with plenty of ribs and striations. Look at its mouth: is there any sign of a groove or canal in its periphery? If so, we can at once take a long stride onwards, and ask if it is transparent; which it is not. And so it has both a groove and a canal, as it happens, and it is decidedly opaque, being, in fact, rather thick and heavy. Is it convolute; that is, does its outer lip turn in so as to make a long narrow mouth as in the cowry? No. Is it fusiform, with a long and narrow mouth? No; neither has it a curved canal, but the canal is covered over and is like a tunnel through the shell. That is enough; the genus is *Murex*, and if the canal had been continued down a long tube, the genus would still be *Murex*.

Let us take another genus, often confused with it, and answering all our questions in the same way up to here. The canal is not covered but open, and is decidedly short. Hence the genus is *Purpura*, and as the ridges are alternately large and small the species is *lapillus*, although sometimes the ridges of that species are all of the same size; and it has the teeth in the throat, which most, but not all, of its representatives have, for *lapillus* has so many variations that only three of its varieties have been thought worth mentioning.

Here is another, in which the margin of the mouth is without a groove or canal. The shell is neither tubular, nor globular, nor ear-shaped, nor cap-shaped, nor is the mouth toothed. It is not coiled flat, and that clears us of four genera; but it is a raised spiral. The pillar does not project beyond its mouth, its apex is not divided into two, nor is it broken off short, and its outer lip is not slit, so we can pass half-a-dozen more genera. Its height is not less than its breadth, that clears away seven more genera. But its height is less than double its breadth, and that leaves us among four genera, from which it can be separated by its having a fold in its pillar. The genus is *Limnæa*, and a reference to the index of genera will show that the species is *stagnalis*.

Yet one more. The margin of the mouth without a groove or canal, no teeth, the shell not coiled flat, the shell a raised spiral, the height less than double the breadth, peristome complete, the pillar without a groove, dextral, not amber-coloured, not richly variegated and polished, not with the inner lip thick and the outer lip sharp, the shell not thin but moderately thick, the mouth nearly circular. At last! The genus is *Cyclostoma*, of which there is but one species, *elegans*, found mostly on the chalk and rarely in other limestone districts, and it is worth knowing as being one of the two British land shells that have an operculum.

CHAPTER VIII.

GLOSSARY.

Aberrant—differing from the type. **Abnormal**—differing from the rule.
Abranchiate—without gills. **Abrade**—to wear away.
Abyssal—pertaining to the deep sea. **Acephalous**—headless.
Acetabula—the suckers of a cephalopod. **Aculeated**—ending in a point.
Acuminate—taper pointed. **Acute**—forming a sharp angle or point.
Adductor—the muscle which draws together the valves of a bivalve.
Albino—the white variety of any species. **Alliaceous**—smelling of garlic.
Amorphous—of no regular form.
Amphineura—an order of the Gastropoda, having the nerves on both sides.
Ampullaceous—in the form of a flask.
Androgynous—having the sexes united in each individual.
Angulated—having angles. **Anterior**—the front or forepart.
Aperture—the mouth of a shell. **Apex**—the top of the spire.
Apical—belonging to the apex. **Articulated**—jointed.
Ascoglossa—a sub-order of Opisthobranchs having the worn-out teeth not dropping off but retained in a special sac.
Attenuated—gradually tapering to a point. **Auriculated**—shaped like an ear.
Axis—the pillar the whorls of a shell are twisted round.
Azygobranchiate—having but one gill, and not a pair equal in size as if they were the arms of a yoke.
Bidentate—having two teeth. **Bifid**—cleft into two parts.
Bilateral—with two symmetrical sides. **Bilobed**—with two lobes.
Bivalve—composed of two plates or valves.
Boss—the umbo or beak of a bivalve shell. **Brackish**—moderately salt.
Branchia—a respiratory organ adapted to breathe air dissolved in water; a gill.
Branchial—belonging to the gills. **Branchiate**—possessing gills.
Buccal—connected with the mouth.
Byssus—the silky filaments by which certain bivalves attach themselves to foreign substances.
Caducous—falling off at certain seasons. **Calcareous**—limy.
Canaliculated—made like a groove. **Cancellated**—cross-barred.
Caperate—wrinkled. **Cardinal**—belonging to the hinge.
Carinated—keeled. **Cephalic**—belonging to the head.
Cinereous—ash-coloured. **Cirrhus**—a filamentary tentacle.
Cladohepatic—having a branching liver.
Clausilium—a shelly plate attached to the pillar by an elastic ligament, and protecting the entrance to the shell.
Clavate—club-shaped. **Columella**—the pillar round which the whorls wind.
Compressed—flattened. **Concave**—rounded inwards.

Concentric—having the same centre. **Conchifera**—an old term for the bivalves.
Constricted—narrowed. **Convex**—rounded outwards.
Cordate—shaped like a heart. **Coriaceous**—leathery. **Corneous**—horny.
Costate—ribbed. **Crenate**—scalloped. **Crenulated**—finely toothed.
Cruciate—in the form of a cross.
Crura—the basal part of a brachiopod's arms, of which the loop is a further development.
Cuneate—shaped like a wedge.
Deciduous—falling off. **Decollated**—having lost the apex of the shell.
Dentated—toothed. **Denticle**—a small tooth. **Depressed**—pressed downwards.
Dextral—right-handed. **Dextrorse**—turned to the right.
Diaphanous—transparent. **Dilated**—Expanded.
Dimyary—having two adductor muscles.
Diotocardiac—having a heart with two auricles. **Diœcious**—having the sexes distinct.
Discoidal—resembling a disc. **Diverging**—radiating.
Dorsal—belonging to the back. **Dorsibranchiate**—with gills attached to the back.
Docoglossa—a section of the Diotocardia in which the radula possesses only a few strong teeth arranged in rows compared to beams.
Edentulous—toothless. **Emarginate**—notched. **Ensiform**—sword-shaped.
Entire—uninterrupted by breaks or notches. **Epidermis**—the outer skin.
Epiphragm—the hardened mucus with which the mouth of some univalve shells is closed.
Epipodium—a fold occurring on the upper edge of the foot.
Equilateral—having sides of equal length.
Equivalve—having valves of equal size. **Excoriated**—worn away.
Euthyneurous—having the nerves straight.
Falciform process—that which serves as a point of attachment for the muscles of the foot and viscera.
Fasciculated—arranged in bundles. **Ferruginous**—containing or resembling iron.
Filament—a thread.
Filibranchiate—having the gill filaments unconnected except by surface cilia.
Filiform—like a thread. **Flexuous**—curved. **Fluviatile**—living in rivers.
Foliaceous—leaflike. **Foliated**—composed of thin laminæ.
Fossette—the pit in which the internal ligament is contained. **Fuscous**—dark brown.
Fusiform—tapering towards both ends. **Gibbous**—swollen.
Glabrous—smooth. **Globose**—almost spherical.
Globular—almost globose. **Granulated**—covered with grains.
Guard—the sheath protecting the phragmocone of certain cephalopods.
Gymnoglossa—a section of the Monotocardia, having no radula.
Haliotoid—ear-shaped.
Heteromyary—having the anterior adductor muscle smaller than the posterior adductor.
Hispid—bristly. **Holohepatic**—having an unbranched liver.
Holostomata—univalve shells with mouths entire.
Hyaline—glassy. **Imbricated**—overlapping. **Inflected**—bent inwards.
Inoperculate—without an operculum. **Intersected**—cut across.
Intorted—twisted inwards. **Involute**—rolled inwards.
Iridescent—rainbow-like in colour.
Isomyary—having the adductor muscles of equal size.
Lamellated—having layers like plates.
Lamellibranchiata—having gills like leaves or plates.
Lamelliform—shaped like a thin plate. **Lanceolate**—shaped like a lance.

Lenticular—shaped like a bi-convex lens.

Ligament—the band uniting the two valves of pelecypods.

Lunate—shaped like a crescent.

Maculated—spotted. **Malacology**—the science which treats of the mollusca.

Mantle—the external integument of the mollusca.

Mesopodium—the middle portion of the foot.

Metapodium—the posterior portion of the foot. **Moniliform**—beaded.

Monœcious—having the sexes united in each individual.

Monomyary—having one adductor muscle.

Monotocardiac—having a heart with one auricle. **Mucronate**—abruptly pointed.

Muricated—covered with prickles.

Myophore—the shelf to which in certain species of bivalves the internal ligament is attached.

Nacreous—pearly. **Nautiloid**—resembling the pearly nautilus in shape.

Normal—usual ; according to rule.

Nudibranchiate—having the breathing organs exposed.

Nucleated—having a nucleus.

Oblique—slanting. **Oblong**—greater in length than in width.

Oboval—oval, with the broad end towards the apex of the shell.

Obtuse—blunt. **Odontophore**—the lingual ribbon or radula.

Operculated—having an operculum.

Operculum—the plate which closes the mouth in many univalves.

Opisthobranchiate—having the breathing organs behind the heart.

Osphradium—the organ of smell, consisting of a modified portion of epithelium.

Otocyst—the organ of hearing, consisting of a small vesicle containing fluid secretion.

Otolith—a concretion suspended in the otocyst. **Ovate**—egg-shaped.

Oviparous—producing eggs. **Ovoid**—nearly elliptical.

Ovoviviparous—producing offspring by hatching the eggs, and retaining the young for a time within the parent's body.

Pallial—belonging to the mantle. **Parapodium**—the lateral edge of the foot.

Paucispiral—having only a few whorls. **Pectinated**—toothed like a comb.

Pectinibranchiate—having comb-like gills. **Pelagic**—pertaining to the ocean.

Periphery—the widest part of the body whorl.

Periostracum—the outer covering of the shell. **Peristome**—the margin of the mouth.

Pinnate—feather-shaped. **Plicate**—folded like a fan.

Polyplacophora—a sub-order of amphineurans, containing those whose shells have many plates.

Propodium—the fore part of the foot.

Prosobranchiate—having the breathing organ in front of the heart.

Protobranchiate—having the simplest form of gill.

Ptenoglossa—a section of the Monotocardia, having a radula in which the outer teeth are largest.

Pteropoda—the class of mollusca having winged feet.

Pulmonate—breathing by means of lungs.

Pulmonobranchiate—having gills like lungs. **Pyriform**—pear-shaped.

Rachiglossa—a section of the Monotocardia, having the teeth in sharp ridges.

Radula—the chitinous band in the mouth and throat of gastropods.

Recurved—bent backwards. **Reticulated**—being of the pattern of network.

Rhipidoglossa—a section of the Diotocardia, having fan-shaped teeth.

Rotund—rounded in outline. **Rufous**—of a reddish colour.

Rugose—wrinkled.
Scalariform—shaped like a ladder.
Septibranchiate—having gills modified into a muscular partition through which the divisions of the pallial chamber communicate by means of narrow orifices.
Serrate—like the teeth of a saw.
Sessile—not supported on a stalk. **Setaceous**—like bristles.
Shagreen—covered with granules like the skin of certain sharks and rays.
Sinistral—to the left hand. **Sinuate**—curved in and out. **Sinuous**—wavy.
Siphon—a tube. **Specific**—pertaining to species.
Spire—the assemblage of whorls excepting the body whorl.
Streptoneurous—having the nerves twisted.
Striated—marked with slender lines like threads. **Sub**—rather; not quite.
Sulcate—furrowed. **Suture**—the line of junction between the whorls.
Tænioglossa—a section of the Monotocardia, having the radula of a compact ribbon shape.
Tectibranchiate—having the breathing organ covered by the mantle.
Terrestrial—living on land and not in water.
Tessellated—patterned like a chess-board. **Testaceous**—shelly.
Toxoglossa—a section of the Monotocardia, having no teeth but marginals, so that the radula resembles an arrow.
Translucent—transmitting light, but not transparent. **Truncate**—cut off short.
Tubercle—a pimple. **Tumid**—swollen.
Turbinated—shaped like a top. **Turreted**—rising in steps.
Ulate—shaped like an awl. **Umbilicated**—having an umbilicus.
Umbilicus—the hole at the base of the axis in univalve shells. **Umbo**—the beak.
Ungulated—shaped like a finger-nail. **Unilateral**—on one side only.
Varix—a raised band or ridge. **Ventricose**—swollen.
Vermiform—shaped like a worm. **Verrucose**—warty. **Viscous**—sticky.
Vitreous—glassy. **Viviparous**—Producing young in a living and perfect state.
Volution—a whorl.
Whorl—a single revolution of the spire in a univalve shell.
Zygobranchiate—having the gills in pairs as if yoked.

CHAPTER IX.

CLASSES, ORDERS, AND SUB-ORDERS.

THE mollusca are divided into four classes :—

1. Cephalopoda (head-footed), having the foot in the form of arms around the head.
2. Gastropoda (belly-footed), having the foot beneath the body.
3. Scaphopoda (spade-footed), having the foot more or less in the shape of a spade.
4. Pelecypoda (axe-footed), having the foot more or less in the shape of an axe.

The Cephalopoda, as stated in Chapter III., are divided into two orders :—

1. Dibranchiata, those with two gills.
2. Tetrabranchiata, those with four gills.

The Gastropoda are divided into four orders, the first containing such forms as have a multivalve shell and are bilaterally symmetrical, the other three being comprised of those which have the shell univalve or absent, and are asymmetrical. Thus we have:—

Shell multivalve—

1. Amphineura.

Shell univalve or absent—

2. Prosobranchiata—gills in front of heart, visceral loop twisted, one pair of tentacles, shell generally operculated ; dioecious.
3. Opisthobranchiata—gills behind heart, visceral loop not twisted and shell not operculated (except in *Actæon*), foot prolonged into lateral epipodia or into parapodia ; monoecious.
4. Pulmonata—air breathing, visceral loop not twisted and shell not operculated, two pairs of tentacles ; monoecious.

The Amphineura have been divided into two sub-orders—Polyplacophora and Aplacophora—of which the latter consists entirely of vermiform species not represented in Britain.

The Prosobranchiata are divided into two sub-orders:

1. Diotocardia—heart usually with 2 auricles; gills 2, bipectinate.
2. Monotocardia—heart with 1 auricle; gill 1, monopectinate.

The Opisthobranchiata have been further divided into four sub-orders—

1. Tectibranchiata—right gill present, shell enveloped in folds of mantle and foot.
2. Pteropoda—foot modified into fins, animal externally symmetrical and internally asymmetrical, with or without mantle fold or shell.
3. Ascoglossa—gills both absent, shell absent; old teeth not lost but preserved in a special *askos* or sac.
4. Nudibranchiata—gills modified or absent, shell absent, mantle fold rudimentary.

The Pulmonata have been divided into two sub-orders:

1. Basommatophora—eyes at base of tentacles.
2. Stylommatophora—eyes at tip of tentacles.

The Scaphopoda have a plain tubular shell, occasionally tumid, but generally pointed and slightly curved, as if it were a model elephant's tusk, and they form an interesting but small class containing only three genera.

The Pelecypoda—the bivalves, conchifera, or lamellibranchiata, as they used to be called—are divided into five orders:—

1. Protobranchiata—gill filaments divergent.
2. Filibranchiata—gill filaments parallel.
3. Pseudolamellibranchiata—gill filaments loosely connected, anterior adductor muscle aborted, so that they have but one muscle instead of two like the others.
4. Eulamellibranchiata—gill filaments bound into plates, mantle edges united at one or more places.
5. Septibranchiata—gills modified into a muscular septum with symmetrical orifices, mantle edges united in three places.

Of these five orders, two have been further divided. The sub-orders of the Filibranchiata are:

1. Anomiacea—one aorta; anterior adductor small; shell with plug perforating right valve.
2. Arcacæ—two aortæ; both adductors large; shell without plug.
3. Mytilacea—one aorta; anterior adductor small; shell without plug.

The sub-orders of the Eulamellibranchiata include the great majority of the British bivalves, but they are not easily distinguishable from description owing to the many exceptions that have to be provided for. We have, therefore, not used them in this system of identification. They are, with the families represented in our fauna.

1. Submytilacea.

   Carditidæ, Astartidæ, Cyprinidæ, Unionidæ, Dreissensiidæ, Lucinidæ, Erycinidæ, Galeommidæ, Cyrænidæ.

2. Tellinacea.

   Tellinidæ, Scrobiculariidæ, Donacidæ, Mactridæ.

3. Veneracea.

   Veneridæ, Petricolidæ.

4. Cardiacea.

   Cardiidæ.

5. Myacea.

   Psammobiidæ, Myidæ, Solenidæ, Glycimeridæ, Gastrochœnidæ.

6. Pholadacea.

   Pholadidæ, Teredinidæ.

7. Anatinacea.

   Pandoridæ, Lyonsiidæ, Anatinidæ.

CHAPTER X.

ORDERS AND FAMILIES.

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FOR the purposes of easy reference, we have here adopted alphabetical order, and not systematic order, as in the preceding chapter. The descriptions of the families are such as are, it is hoped, sufficient to distinguish them among their British representatives. The numbers, as in all the chapters, refer to the coloured plates.

Amphineura. (GASTROPODA.) Plate xvi. Nos. 190 to 200.

CHITONIDÆ.—Shell somewhat resembling that of a wood-louse, and composed of eight overlapping valves surrounded and kept in position by a muscular girdle, external portion of the valves largely composed of chitin. *Chiton*, 190 to 200.

Eulamellibranchiata. (PELECYPODA.) Plates v. to xv. Nos. 49 to 178.

ANATINIDÆ.—Shell thin, oval or oblong, gaping on each side, and truncated at posterior end; internal cartilage contained in a receptacle beneath the beak in each valve; hinge with free crescentic ossicle; muscular scars small and irregular, pallial scar narrowly but deeply sinuated; a fourth pallial orifice. *Thracia*, 174 to 178.

ASTARTIDÆ.—Shell triangular, thick, concentrically grooved or furrowed; ligament external; hinge with three cardinals in each valve, and with two laterals in each valve that are ridge-like and obscure. *Astarte*, 50 to 52.

CARDIIDÆ.—Shell equivalve and heart-shaped, with radiating ribs, and often with concentric foliations forming scales and spines and tubercles; beaks prominent; ligament external; the two adductor scars oval and distinct, pallial scar entire; no byssus; foot long and sickle-shaped. *Cardium*, 129 to 138.

CARDITIDÆ.—Shell equivalve and inequilateral; ligament external; muscular scars large, round, and deep, pallial scar entire; hinge with a lateral tooth in both valves, one double cardinal tooth in the right valve, and two cardinals in the left. *Cyamium*, 49.

CYPRINIDÆ.—Shell equivalve, thick, concentrically furrowed or striated; beaks often spiral; ligament external; hinge with two or three cardinal teeth in each valve and usually a posterior tooth; muscular scars oval and distinct, pallial scar entire. *Cyprina*, 53; and *Isocardia*, 54.

CYPRÆNIDÆ.—Shell suborbicular and thin; hinge with cardinal and lateral teeth; ligament external and placed on posterior side of hinge; foot large and tongue-shaped; no byssus; one siphon or two siphons more or less united. *Sphærium*, 81 to 84; and *Pisidium*, 85 to 89.

DONACIDÆ.—Shell equivalve, solid, smooth, sub-triangular, or wedge-shaped, inside margin with notches; ligament external. *Donax*, 104 to 106.

DREISSENSIIDÆ.—Shell mytiliform, rising to a ridge in the middle of each valve, equivalve, inequilateral, ventricose, beaks anterior; below the beak a triangular shelf for the anterior muscle; ligament internal; hinge toothless or with minute cardinals; anterior adductor impression small, posterior large; shell attached by a byssus. *Dreissensia*, 60.

ERYCINIDÆ.—Shell equivalve, inequilateral, thin; mantle edges with three apertures; cartilage internal; beaks calyciform; foot long, broad, and with a byssus. *Kellia*, 73, 74; *Lasæa*, 75; *Lepton*, 76 to 79.

GALEOMMIDÆ.—Shell equilateral, thin; mantle reflected over a considerable part of the valves; mantle edges with three apertures; foot long, broad and with a byssus. *Galeomma*, 80.

GASTROCHŒNIDÆ.—Shell equivalve, gaping; with thin, edentulous valves occasionally cemented to a calcareous tube or sheath. The tube is club-shaped, long and slender; it is covered with adhering particles of sand, and divided off by a partition into two portions, the anterior end containing the shell, the posterior, or narrower end, the siphons. *Gastrochæna*, 159.

GLYCIMERIDÆ.—Shell more or less equivalve, rhomboidal, gaping and obliquely truncated at posterior end; hinge, toothless or with two weak cardinals, having an upright ledge to support the ligament,which is external; pallial scar far in and with a deep sinus; adductor scars large and conspicuous. *Saxicava*, 156, 157; *Pænopæa*, 158.

LUCINIDÆ.—Shell equivalve, occasionally toothless; pallial scar entire; adductor scars conspicuous, that of the anterior muscle being long and falling within the uninterrupted pallial line. *Lucina*, 61, 62; *Loripes*, 63, 64; *Diplodonta*, 65; *Axinus*, 66 to 68; *Montacuta*, 69 to 72.

LYONSIIDÆ.—Shell inequivalve, oblong, nearly equilateral; teeth usually absent, right valve more convex than the left; hinge with a free plate or ossicle, covering the ligament which is in an internal groove. *Lyonsia*, 173.

MACTRIDÆ.—Shell equivalve and triangular; hinge with ligament on larger side of shell in an internal groove, the other portion external; a forked cardinal tooth in the left valve fitting into a branching tooth in the right valve; muscular scars deep and distinct. *Amphidesma*, 107; and *Mactra*, 108 to 112.

MYIDÆ.—Shell inequivalve, oblong, and gaping widely on the posterior side, and often, but more narrowly, on the anterior side also; pallial line broad and deeply sinuated, muscular scars large and distinct; ligament on a prominent shelf; periostracum wrinkled and extensive. *Mya*, 143 to 145; *Corbula*, 146; *Lutraria*, 147, 148.

PANDORIDÆ.—Shell inequivalve, semilunar, pearly, and gaping at posterior end, which is flexuous and elongated; ligament entirely internal, long and oblique and often with calcareous ossicle; pallial line entire or with slight sinus. *Pandora*, 172.

PETRICOLIDÆ.—Shell oval or elongated, thin, gaping slightly behind; hinge with three teeth in each valve, the external often obsolete; pallial sinus deep and well marked. *Petricola*, 128.

PHOLADIDÆ.—Shell gaping at both ends without hinge or ligament; one or more accessory dorsal pieces; an internal apophysis from the beak cavity; dorsal margin partly reflected over the beaks. *Pholas*, 160 to 163; *Pholadidea*, 164; *Xylophaga*, 165.

PSAMMOBIIDÆ.—Shell nearly equilateral, long oval, compressed, striated concentrically and longitudinally, posterior side somewhat truncate and gaping; ligament external and prominent; two cardinal teeth in each valve, the posterior one in the left valve being small and set obliquely, the others being cloven; pallial sinus deep. *Psammobia*, 139 to 142.

SCROBICULARIIDÆ.—Shell equivalve, white, gaping at posterior end; beaks turned towards posterior side, and almost contiguous; hinge teeth weak, and consisting of two small cardinals in right valve and one in the left valve; ligament in an internal cavity. *Scrobicularia*, 99 to 103.

SOLENIDÆ.—Shell equivalve, narrow, long, and gaping at both ends; hinge strengthened inside by a ridge; teeth usually two and three, the cardinals being shaped like thorns; ligament external; beaks flattened. *Solecurtus*, 149 and 150; *Ceratisolen*, 151; *Solen*, 152 to 155.

TELLINIDÆ.—Shell equivalve, compressed; ligament external, and on shortest side of shell; beaks incurved and nearly straight; siphons separated, slender, and very long; mantle widely open in front, and with fringed margin; foot and labial palpi large; adductor scars far apart; pallial impression deeply sinuated. *Tellina*, 90 to 97; *Gastrana*, 98.

TEREDINIDÆ.—Shell small, continued into a long, calcareous tube; valves deeply notched; an internal apophysis; siphons long, and ending with two calcareous pallets. *Teredo*, 166 to 171.

UNIONIDÆ.—Shell equivalve, oblong, inequilateral, pearly within; large external ligament; anterior hinge teeth thick and striated, posterior teeth often wanting; all teeth occasionally rudimentary. *Unio*, 55 to 57, and *Anodonta*, 58, 59.

VENERIDÆ.—Shell regular and solid; hinge usually with three large, diverging cardinal teeth, laterals variable; ligament external; adductor scars oval and distinct, pallial line deeply sinuated. *Circe*, 113; *Venus*, 114 to 121; *Lucinopsis*, 122; *Tapes*, 123 to 126; *Venerupis*, 127.

Filibranchiata. (PELECYPODA.) Plates i. and ii. Nos. 9 to 29.

ANOMIIDÆ.—Shell irregularly oyster-shaped, having no teeth, and being attached to rocks and stones by a calcified byssus which passes through a large hole near the hinge. *Anomia*, 9, 10.

ARCADÆ.—Shell with valves equal; hinge long with many serrate teeth; muscular impressions nearly equal; foot large, bent, and grooved; mantle edge with composite eyes. *Arca*, 11 to 15; *Pectunculus*, 16; *Limopsis*, 17, 18.

MYTILIDÆ.—Shell with valves equal, but inequilateral; beaks incurved; anterior muscular impression small, posterior impression large; byssus well developed; ligament long and narrow and in a groove. *Mytilus*, 19 to 23; *Crenella*, 24, 25; *Modiolaria*, 26 to 29.

Opisthobranchiata. (GASTROPODA.) Plates xxx. to xxxiii. Nos. 550 to 611.

ASCOGLOSSA. Plate xxxi. Nos. 586 to 590.

ELYSIIDÆ.—Body depressed, head rather elevated; no branchiæ; no shell; sides of body dilated into two large wings. *Elysia*, 588.

HERMÆIDÆ.—Body depressed; no branchiæ; no shell; cerata in several rows. *Hermæa*, 586; *Alderia*, 587.

LIMAPONTIIDÆ.—Body slug-like; no branchiæ or other appendages; no shell. *Limapontia*, 589; *Actæonia*, 590.

NUDIBRANCHIATA. Plates xxxi., xxxii. Nos. 591 to 611.

ÆOLIDIDÆ.—Body slug-like; head with tentacles; dorsal area with rows of cerata usually containing sting cells. *Æolis*, 591; *Embletonia*, 592; *Fiona*, 593; *Proctonotus*, 594; *Antiopa*, 595; *Hero*, 596.

DENDRONOTIDÆ. — Body slug-like, rather compressed; two rows of arborescent cerata; no tentacles; pointed margin, with arborescent papillæ. *Dendronotus*, 599.

DORIDIDÆ.—Branchiæ of a circle or semicircle of pinnate leaves, united at base. *Doris*, 603.

DOTONIDÆ.—Body slug-like; two rows of cerata, each ceras surrounded by a ring of tubercles. *Doto*, 598.

GONIODORIDÆ.—Body oval; branchiæ multifoliate, and in the shape of a horseshoe. *Goniodoris*, 609; *Ancula*, 610; *Idalia*, 611.

LOMANOTIDÆ.—Body slug-like; one row of small cerata; no tentacles. *Lomanotus*, 597.

PLEUROPHYLLIDIIDÆ.—Body covered by arched shield, with lateral angles prolonged; mantle pale reddish brown, with small black specks. *Pleurophyllidia*, 601.

POLYCERIDÆ.—Body slug-like; branchiæ not retractile; tentacles simple, usually surrounding the posterior end. *Polycera*, 604; *Ægirus*, 605; *Triopa*, 606; *Thecacera*, 607; *Crimora*, 608.

Scyllæidæ.—Body oblong, compressed; two large, foliated cerata, with branchial appendages on the inner side; no tentacles. *Scyllæa*, 600.

Tritoniidæ.—Body long; two rows of unequal arborescent cerata. *Tritonia*, 602.

PTEROPODA. Plate xxx. Nos. 583 to 585.

Cavoliniidæ.—Fins large, shell a cone, angular or circular, very thin, ridged lengthwise or spinous; five ridges in front and one at back. *Clio*, 584.

Clionidæ.—Body long, angulated behind, no shell. *Clione*, 585.

Limacinidæ.—Fins very large, shell spiral, thin and fragile, translucent; whorls five in number, tumid, the last more than half the shell; umbilicus small. *Spirialis*, 583.

TECTIBRANCHIATA. Plate xxx. Nos. 550 to 582.

Actæonidæ.—Shell spiral, solid, entirely covering the animal; spirally striated; spire generally prominent, pillar with ridge-like fold continued within the spire; suture well marked. *Actæon*, 550.

Aplysiidæ.—Shell arched, flattened, slightly convolute at smaller end which is thickened by a projection; mouth extending whole length of shell; spire short and terminal. *Aplysia*, 577 to 579.

Bullidæ.—Shell convolute internal or partly internal; spire hidden or nearly so, mostly short; mouth extending the whole length of the shell or nearly so. *Bulla*, 565 to 567; *Acera*, 568.

Philinidæ.—Shell internal, thin, slightly spiral; spire small and truncated; mouth large and open; pillar sharp-edged, flexuous and visible throughout. *Philine*, 569 to 576.

Pleurobranchidæ.—Dorsal region protected by a covering or shell. *Pleurobranchus*, 580 to 581.

Runcinidæ.—No shell. *Runcina*, 582.

Scaphandridæ.—Shell oval, spirally striated, external, covering all or nearly all the animal; spire hidden; mouth extending whole length of shell, contracted behind, expanded in front; pillar smooth and with a blunt edge. *Scaphander*, 558, 559; and *Cylichna*, 560 to 564.

Tornatinidæ.—Shell cylindrical or globular, covering the animal, spire truncated; whorls keeled; mouth extending whole length of shell, expanding in front; small fold at base of pillar. *Tornatinus*, 551 to 557.

Prosobranchiata. (Gastropoda.) Plates xxi. to xxix. Nos. 319 to 549.

Aciculidæ.—Shell small, cylindrical, thin, with long blunt spire; mouth oval; umbilicus straight; operculum horny. *Acicula*, 398.

Acmæidæ.—Shell patelliform; crown close to front margin; internal border distinctly marked. *Tectura*, 319.

ADEORBIDÆ.—Shell small, porcellanous, depressed, circular or ear-shaped; umbilicus wide, operculum horny; spire depressed, mouth obliquely rhombic, angulated above and emarginate below. *Adeorbis*, 438.

APORRHAIDÆ.—Shell with outer lip dilated; spire turreted and tapering; no umbilicus, operculum pear-shaped. *Aporrhais*, 455, 456.

ASSIMINEIDÆ.—Shell small, conoidal; spire short; mouth roundish oval, inner lip thick, outer lip sharp; operculum horny, nucleus on inner side of mouth. *Assiminea*, 432, 433.

BUCCINIDÆ.—Shell fusiform, thick, ridged; spire short, body whorl large; mouth oval, pillar twisted; canal short and curved back; operculum horny and never spiral. *Buccinum*, 517, 518; *Buccinopsis*, 519.

CÆCIDÆ.—Shell a cylinder curved or straight, the spire being lost when young; operculum horny, circular with a central nucleus. *Cæcum*, 453, 454.

CAPULIDÆ.—Shell patelliform, spire small; generally an internal plate to which the adductors are attached; no operculum. *Capulus*, 382; *Calyptræa*, 383; *Crepidula*, 384.

CERITHIIDÆ.—Shell long, spire tapering to a fine point; whorls many, generally tuberculate, varicose or spiny; mouth small, sometimes strongly channelled; groove at base short and recurved; no umbilicus. *Cerithium*, 443 to 446; *Cerithiopsis*, 447 to 451.

COLUMBELLIDÆ.—Shell small, fusiform, mouth narrow, canal short and deeply notched, outer lip thick and sinuated; pillar with one fold at base; operculum horny. *Columbella*, 511, 512.

CONIDÆ.—Shell fusiform; spire tapering or turreted; mouth narrow and oblong; outer lip notched at or near suture, pillar smooth, canal nearly straight. *Mangilia*, 530 to 535; *Pleurotoma*, 536 to 549.

CYCLOSTOMATIDÆ.—Shell spiral; spire elevated; mouth circular or nearly so; umbilicus small and narrow; operculum solid. *Cyclostoma*, 397.

CYCLOSTREMATIDÆ.—Shell discoidal, cancellated; mouth nearly circular; umbilicus wide; operculum spiral, calcareous. *Cyclostrema*, 335 to 337.

CYPRÆIDÆ.—Shell convolute, solid, spire hidden; mouth long, straight, narrow, toothed at sides, channelled at ends, outer lip folding inwards. *Cypræa*, 457; *Ovula*, 458.

EULIMIDÆ.—Shell subulate, small and long, with many whorls: spire finely tapering; mouth pyriform; operculum horny, with nucleus on inner side. *Eulima*, 461 to 466; *Stilifer*, 467.

FASCIOLARIIDÆ.—Shell fusiform, spire long and tapering; throat and pillar smooth; pillar curved; canal often very long; operculum horny; no umbilicus. *Fusus*, 520 to 528.

FISSURELLIDÆ.—Shell patelliform, elevated or depressed, with a slit in the crown, in front of the crown, or on the anterior margin. *Fissurella*, 326, 327; *Puncturella*, 328; and *Emarginula*, 329 to 332.

HALIOTIDÆ.—Shell ear-shape; spire flattened; mouth large and pearly; outer lip perforated, the perforations being successively filled up when no longer required for the protrusion of the tentacles of the mantle. *Haliotis*, 333.

HOMALOGYRIDÆ.—Shell a small, flat coil, with involute spire; whorls angulated; operculum with few whorls and a central nucleus. *Homalogyra*, 385, 386.

HYDROBIIDÆ.—Shell conical, small, smooth; mouth entire; an umbilical cleft; eyes at the base of the tentacles. *Hydrobia*, 426 to 429; *Bithynia*, 430, 431.

IANTHINIDÆ.—Shell heliciform, violet in colour, thin, translucent, fragile; whorls few and ventricose; mouth four-sided. *Ianthina*, 357 to 359.

JEFFREYSIIDÆ.—Shell minute, translucent, smooth, and glossy; mouth oval or roundish; operculum with marginal nucleus divided by an inner rib. *Jeffreysia*, 435 to 437.

LAMELLARIIDÆ.—Shell more or less internal; ear-shaped or cap-shaped, thin, pellucid, and fragile; spire very small, mouth large, no operculum. *Lamellaria*, 377; *Velutina*, 378, 379.

LEPETIDÆ.—Shell limpet-shaped, crown central or nearly central. *Lepeta*, 322; *Propilidium*, 323.

LITTORINIDÆ.—Shell strong and never pearly; pillar thickened; mouth rounded and entire; operculum horny, thin, ear-shaped, nucleus excentrical. *Littorina*, 387 to 391; *Lacuna*, 392 to 396.

MARGINELLIDÆ.—Shell oval, polished; mouth truncated, narrow, channelled at base only, and nearly as long as shell; outer lip thickened, pillar with few oblique folds. *Marginella*, 529.

MURICIDÆ.—Shell having a straight anterior canal, and being oblong and solid and tuberculate, spiny or varicose; spire produced; mouth oval; pillar not twisted. *Trophon*, 503 to 505; *Murex*, 506, 507; *Purpura*, 508, 509; *Lachesis*, 510.

NASSIDÆ.—Shell oblong, small; spire turreted; canal short and abrupt; outer lip thickened, often toothed; operculum horny. *Nassa*, 513 to 516.

NATICIDÆ.—Shell globular, thick, smooth, few whorls, and small spire; outer lip simple; large umbilicus; operculum horny and calcareous. *Natica*, 370 to 376.

NERITIDÆ.—Shell globular, thick; spire small; mouth semi-lunate, side near pillar being expanded; operculum calcareous, with prominent apophyses on interior face, one of which locks behind the lip of the pillar. *Neretina*, 356.

PATELLIDÆ.—Shell conical with apex turned forwards; mouth forming entire base of cone. *Patella*, 324; *Helcion*, 325.

PLEUROTOMARIIDÆ.—Shell trochiform with sinus band extending nearly to apex; umbilicus deep; operculum horny, circular and multi-spiral, nucleus central. *Scissurella*, 334.

PYRAMIDELLIDÆ.—Shell small, conical, turreted, apical whorls sinistral; mouth small, angulated, channelled, outer lip thin; operculum horny, ear-shaped, nucleus excentrical. *Odostomia*, 468 to 502.

RISSOIDÆ.—Shell small, oblong or oval, white or horny; spire usually long; mouth oval or trumpet-shaped, angulated above and slightly expanded below; operculum horny. *Rissoa*, 400 to 424.

SCALARIIDÆ.—Shell long, turreted, with transverse ribs; mouth round; operculum horny and few whorled. *Scalaria*, 360 to 364; *Aclis*, 365 to 369.

SKENEIDÆ.—Shell small, circular; spire much depressed or involute; mouth round; operculum horny, round and spiral. *Skenea*, 434.

TRICHOTROPIDÆ.—Shell conical, last whorl large; spire erect; mouth grooved within at the base; operculum blunt and claw-shaped. *Trichotropis*, 380; *Torellia*, 381.

TRITONIDÆ.—Shell thick, outer lip inflected and thickened; whorls strengthened lengthwise by varicose ribs; spire bluntly pointed; outer lip and pillar folded or tuberculate; canal straight; operculum horny, nucleus at outer base of mouth. *Triton*, 459, 460.

TROCHIDÆ.—Shell nacreous, pyramidal with a nearly flat base, whorls many, flat and striated; pillar twisted; operculum horny. *Trochus*, 338 to 354.

TRUNCATELLIDÆ.—Shell cylindrical, minute; spire truncated, whorls striated transversely; mouth oval; operculum horny, sub-spiral, ear-shaped. *Truncatella*, 399.

TURBINIDÆ.—Shell bulimoid, polished, richly coloured; whorls convex; mouth oval, not pearly; operculum shelly. *Phasianella*, 355.

TURRITELLIDÆ.—Shell pyramidal and long, upper part divided off when disused; whorls many, slowly enlarging, spirally ribbed or striated; mouth small, round or inclined to be square; operculum horny, rather solid, puckered obliquely, nucleus central. *Turritella*, 452.

VALVATIDÆ.—Shell turbinate or discoidal; spire short and symmetrical; mouth rounded and entire; umbilicated; operculated; operculum horny, nucleus central. *Valvata*, 441, 442.

VIVIPARIDÆ.—Shell turbinate with long symmetrical spire, whorls rounded, mouth oval, operculum horny and irregularly concentric. *Viviparus*, 439, 440.

Protobranchiata. (PELECYPODA.) Plate i. Nos. 1 to 8.

NUCULIDÆ.—Gills small; labial pulpi very large; mantle free all round; foot long; shell like a small nut with many serrate teeth, often with posterior side produced. Genera, *Nucula*, 1 to 4; and *Leda*, 5 to 8.

Pseudolamellibranchiata. (PELECYPODA.) Plates iii. to v. Nos. 30 to 48.

AVICULIDÆ.—Shell oblique and winged; with long straight dorsal margin; posterior adductor nearly central; anterior adductor, when present, leaving impression within the beak. *Avicula*, 30; *Pinna*, 31.

LIMIDÆ.—Shell nearly equivalve, eared; cartilage external; muscular scar on one side. *Lima*, 44 to 48.

OSTREIDÆ.—Shell irregular, attached by the left valve; a single adductor; hinge without teeth; margins occasionally notched; cartilage internal and horizontal on the hinge line; no foot; mantle lobes free all round. *Ostrea*, 32.

PECTINIDÆ.—Shell equilateral, with unequal wings at beak; inequivalve; some with the right valve convex and the left flat; cartilage internal and in a cavity beneath the beaks. *Pecten*, 33 to 43.

Pulmonata. (GASTROPODA.) Plate xvii. to xx. Nos. 201 to 318.

AURICULIDÆ.—Shell spiral, conoidal; mouth toothed; umbilicus indistinct or absent; tentacles two, not retractile, eyes generally at base. *Carychium*, 201; *Melampus*, 202, 203.

HELICIDÆ.—Animal terrestrial; shell spiral, globose or coil-shaped; with or without umbilicus; tentacles four, retractile; eyes at the tip of the upper pair which are the longer. *Vitrina*, 247; *Zonites*, 248 to 258; *Bulimus*, 259 to 262; *Helix*, 263 to 287.

LIMACIDÆ.—Animal terrestrial; shell internal, placed beneath the mantle, rudimentary or shield shaped; tentacles four, cylindrical, retractile; eyes at the tip of the dorsal pair. *Amalia*, 232, 233; *Limax*, 234 to 240; *Arion*, 241 to 245; *Geomalacus*, 246.

LIMNÆIDÆ. — Shell spiral, hood-shaped, or coil-shaped; thin; horn-coloured; mouth without teeth, lip sharp; pulmonary sac protected by an external lobe; tentacles two, not retractile; eyes at base. *Ancylus*, 205, 206; *Limnæa*, 207 to 214; *Planorbis*, 215 to 226.

ONCHIDIIDÆ.—No shell; animal oval and slug-like; two tentacles, retractile, with eyes at their tips; a thick mantle over the dorsal region, covered with tubercles, having eyes identical in type with those of the vertebrata; foot much narrower than mantle. *Onchidium*, 318.

OTINIDÆ.—Shell ear-shaped and minute, spire short, apex introverted, mouth large, outer lip plain and sharp, no operculum; tentacles two, not retractile; eyes at base. *Otina*, 204.

PHYSIDÆ.—Shell sinistral, lustrous, thin, without operculum; mantle covering part of the shell; tentacles two, not retractile; eyes at base. *Physa*, 227 to 229.

PUPIDÆ.—Shell cylindrical or oblong, occasionally furnished with internal lamellæ; many narrow whorls, last whorl no broader than the preceding; mouth generally with one or more teeth. *Pupa*, 288 to 291; *Vertigo*, 292 to 302; *Balea*, 303; *Clausilia*, 304 to 309; *Cochlicopa*, 310, 311.

STENOGYRIDÆ.—Shell long, cylindrical, thin, translucent; spire long, whorls rapidly increasing in size, mouth notched. *Achatina*, 312.

SUCCINEIDÆ.—Shell oval or oblong, thin; spire short, last whorl large, mouth obliquely oval; tentacles four, retractile. *Succinea*, 313 to 317.

TESTACELLIDÆ.—Animal terrestrial and slug-like; shell rudimentary, ear-shaped and external, and borne at the posterior end of the body, two pairs of retractile tentacles, eyes at the tip of the upper pair. *Testacella*, 230, 231.

Septibranchiata. (PELECYPODA.) Plate xv. Nos. 179 to 183.

POROMYIDÆ.—Shell small, inequivalve, pearly within; cartilage in a triangular cavity under each beak; hinge strong, toothless or not, and having occasionally an ossicle; foot long and narrow; siphons short, unequal, separate and surrounded by a tentacular fringe. *Poromya*, 179; *Neæra*, 180 to 183.

CHAPTER XI.

FAMILIES AND GENERA.

IN this the families are arranged alphabetically, and the chief distinguishing marks of their constituent genera noted and compared. The orders are given as facilitating reference to the preceding chapter.

Aciculidæ. (PROSOBRANCHIATA.) Plate xxiii.

Acicula, 398.

Acmæidæ. (PROSOBRANCHIATA.) Plate xxi.

Tectura, 319.

Actæonidæ. (OPISTHOBRANCHIATA.) Plate xxx.

Actæon, 550.

Adeorbidæ. (PROSOBRANCHIATA.) Plate xxiv.

Adeorbis, 438.

Æolididæ. (OPISTHOBRANCHIATA.) Plate xxxi.

Æolis, body limaciform, branchial processes in transverse rows, tentacles four—two dorsal, two oral, 591.

Embletonia, tentacles two, 592.

Fiona, tentacles four, sub-dorsal, 593.

Proctonotus, body depressed; tentacles four—two dorsal, two oral, 594.

Antiopa, body ovoid, depressed, 595.

Hero, body limaciform, branchial processes in one series, 596.

Anatinidæ. (EULAMELLIBRANCHIATA.) Plate xv.

Thracia, 174.

Anomiidæ. (FILIBRANCHIATA.) Plate i.

Anomia, 9, 10.

Aplysiidæ. (OPISTHOBRANCHIATA.) Plate xxx.

Aplysia, 577-579.

Aporrhaidæ. (PROSOBRANCHIATA.) Plate xxv.

Aporrhais, 455, 456.

Arcadæ. (FILIBRANCHIATA.) Plate i.

Arca, hinge straight, 11-15.

Pectunculus, shell orbicular, nearly equilateral; hinge semicircular, striated ligamental area, 16.

Limopsis, hinge with two curved series of transverse teeth and triangular cartridge pit in the middle, 17, 18.

Assimineidæ. (PROSOBRANCHIATA.) Plate xxiv.

Assiminea, 432, 433.

Astartidæ. (EULAMELLIBRANCHIATA.) Plate v.

Astarte, 50-52.

Auriculidæ. (PULMONATA.) Plate xvii.

Carychium, umbilicus an oblique slit, 201.

Melampus, no umbilicus, 202, 203.

Aviculidæ. (PSEUDOLAMELLIBRANCHIATA.) Plate iii.

Avicula, shell winged; hinge with teeth, 30.

Pinna, shell triangular, not winged; hinge without teeth, 31.

Buccinidæ. (PROSOBRANCHIATA.) Plate xxvii.

Buccinum, coarsely grooved, operculum lamellar, with nucleus on outer side of mouth, 517, 518.

Buccinopsis, finely striated, operculum with nucleus on inner side of mouth, 519.

Bullidæ. (OPISTHOBRANCHIATA.) Plate xxx.

Acera, mouth extending nearly the length of the shell, 568.

Bulla, mouth extending the whole length of the shell, 565-567.

Cæcidæ. (PROSOBRANCHIATA.) Plate xxv.

Cæcum, 453, 454.

Capulidæ. (PROSOBRANCHIATA.) Plate xxiii.

Capulus, shell cap-shaped, no internal plate, 382.

Calyptræa, shell conical, with internal plate, 383.

Crepidula, shell slipper-shaped, with septum covering half the mouth, 384.

Cardiidæ. (EULAMELLIBRANCHIATA.) Plate xi.

Cardium, 129-138.

Carditidæ. (EULAMELLIBRANCHIATA.) Plate v.

Cyamium, 49.

Cavoliniidæ. (OPISTHOBRANCHIATA.) Plate xxx.

Clio, 584.

Cerithiidæ. (PROSOBRANCHIATA.) Plate xxiv.

Cerithium, mouth small, with a groove at its base, short and recurved, 443-446.

Cerithiopsis, mouth small, with a canal, short, truncated, and straight, 447-451.

Chitonidæ. (AMPHINEURA.) Plate xvi.

Chiton, 190-200.

Clionidæ. (OPISTHOBRANCHIATA.) Plate xxx.

Clione, 585.

Columbellidæ. (PROSOBRANCHIATA.) Plate xxvi.

Columbella, 511, 512.

Conidæ. (PROSOBRANCHIATA.) Plate xxix.

Mangilia, inside of mouth grooved, outer lip notched at its junction with periphery, 530-535.

Pleurotoma, inside of mouth smooth, outer lip notched below its junction with periphery, 536-549.

Cyclostomatidæ. (PROSOBRANCHIATA.) Plate xxiii.

Cyclostoma, 397.

Cyclostrematidæ. (PROSOBRANCHIATA.) Plate xxi.

Cyclostrema, 335-337.

Cypræidæ. (PROSOBRANCHIATA.) Plate xxv.

Cypræa, outer lip ribbed, 457.

Ovula, outer lip plain, 458.

Cyprinidæ. (EULAMELLIBRANCHIATA.) Plate v.

Cyprina, beak not spiral, 3 cardinal teeth, 53.

Isocardia, beak spiral, 2 cardinal teeth, 54.

Cyrænidæ. (EULAMELLIBRANCHIATA.) Plate vii.

Sphærium, shell nearly equilateral, with two siphons, beak near middle of dorsal margin, 81-84.

Pisidium, shell inequilateral, with one siphon, beak near anterior end, 85-89.

Dendronotidæ. (OPISTHOBRANCHIATA.) Plate xxxii.

Dendronotus, 599.

Dentaliidæ. (SCAPHOPODA.) Plate xv.

Cadulus, shell spindle-shaped, 185, 186.

Dentalium, shell tusk-like, with or without slit, 187-189.

Siphonodentalium, shell tusk-like, with 4 notches at base, 184.

Donacidæ. (EULAMELLIBRANCHIATA.) Plate viii.

Donax, 104-106.

Dorididæ. (OPISTHOBRANCHIATA.) Plate xxxiii.

Doris, 603.

Dotonidæ. (OPISTHOBRANCHIATA.) Plate xxxii.

Doto, 598.

Dreissensiidæ. (EULAMELLIBRANCHIATA.) Plate vii

Dreissensia, 60.

Elysiidæ. (OPISTHOBRANCHIATA.) Plate xxxi.

Elysia, 588.

Erycinidæ. (EULAMELLIBRANCHIATA.) Plate vii.

Lepton, a cardinal and two strong lateral teeth in each valve, 76-79.

Lasæa, a small cardinal in the left valve and two strong lateral teeth in each valve, 75.

Kellia, a thick, erect cardinal in the left valve, and in each valve two strong laminar teeth which are partly cardinal and partly lateral, 73, 74.

Eulimidæ. (PROSOBRANCHIATA.) Plate xxv.

Eulima, shell subulate, tapering to a regular point, 461-466.

Stilifer, shell globose, spire divided into two parts, 467.

Fasciolariidæ. (PROSOBRANCHIATA.) Plates xxvii., xxviii., xxix.

Fusus, 520-528.

Fissurellidæ. (PROSOBRANCHIATA.) Plate xxi.

Fissurella, slit at the crown, 326, 327.

Puncturella, slit in front of the crown, 328.

Emarginula, slit on anterior margin, 329-332.

Galeommidæ. (EULAMELLIBRANCHIATA.) Plate vii.

Galeomma, 80.

Gastrochœnidæ. (EULAMELLIBRANCHIATA.) Plate xiv.

Gastrochæna, 159.

Glycimeridæ. (EULAMELLIBRANCHIATA.) Plate xiv.

Saxicava, pallial scar interrupted or broken up into separate spots, 156, 157.

Panopæa, pallial scar entire, 158.

Goniodoridæ. (OPISTHOBRANCHIATA.) Plate xxxiii.

Goniodoris, oral tentacles flattened and angular, 609.

Ancula, oral tentacles of two tubercular processes on the sides of the head, 610.

Idalia, no oral tentacles, 611.

Haliotidæ. (PROSOBRANCHIATA.) Plate xxi.

Haliotis, 333.

Helicidæ. (PULMONATA.) Plates xix., xx.

Vitrina, shell greenish, subglobular, thin, vitreous, no umbilicus, 247.

Zonites, shell orbicular, thin, mouth oblique, umbilicus more or less distinct, 248-258.

Bulimus, shell long and spiral, mouth oval, umbilicus small, 259-262.

Helix, shell globular or flattened, mouth circular or oval, outer lip generally thick and having a rib, sometimes reflected and toothed, 263-287.

Hermæidæ. (OPISTHOBRANCHIATA.) Plate xxxi.

Hermæa, tentacles 2, body ovate, 586.

Alderia, tentacles none or rudimentary, body tapering, 587.

Homalogyridæ. (PROSOBRANCHIATA.) Plate xxiii.

Homalogyra, 385, 386.

Hydrobiidæ. (PROSOBRANCHIATA.) Plate xxiv.

Hydrobia, eyes on tubercles, operculum horny, 426-429.

Bithynia, eyes sessile, operculum shelly, 430, 431.

Ianthinidæ. (PROSOBRANCHIATA.) Plate xxii.

Ianthina, 357.

Jeffreysiidæ. (PROSOBRANCHIATA.) Plate xxiv.

Jeffreysia, 435-437.

Lamellariidæ. (PROSOBRANCHIATA.) Plate xxiii.

Lamellaria, shell internal, ear-shaped, very thin, 377.

Velutina, shell external, cap-shaped, spire small, suture deep, 378, 379.

Lepetidæ. (PROSOBRANCHIATA.) Plate xxi.

Lepeta, crown almost central, 322.

Propilidium, crown central, a shell-like, triangular plate, 323.

Limacidæ. (PULMONATA.) Plate xviii.

Amalia, breathing hole in posterior half of shield, shield shagreened, 232, 233.

Limax, breathing hole in posterior half of shield, shield concentrically wrinkled, 234-240.

Arion, breathing hole half-way along shield, shell of loose calcareous grains, covered by hinder part of shield, 241-245.

Geomalacus, breathing hole near front edge of shield, shell unguiform, imbedded in the shield, 246.

Limacinidæ. (OPISTHOBRANCHIATA.) Plate xxx.

Spirialis, 583.

Limapontiidæ. (OPISTHOBRANCHIATA.) Plate xxxi.

Limapontia, no tentacles, 589.

Actæonia, two tentacles, 590.

Limidæ. (PSEUDOLAMELLIBRANCHIATA.) Plate v.

Lima, 44-48.

Limnæidæ. (PULMONATA.) Plate xvii.

Ancylus, shell hood-shaped, 205, 206.

Limnæa, shell spiral, 207-214.

Planorbis, shell a flat coil, 215-226.

Littorinidæ. (PROSOBRANCHIATA.) Plate xxiii.

Lacuna, pillar channelled or grooved, 392-396.

Littorina, pillar not channelled or grooved, 387-391.

Lomanotidæ. (OPISTHOBRANCHIATA.) Plate xxxii.

Lomanotus, 597.

Lucinidæ. (EULAMELLIBRANCHIATA.) Plate vii.

Lucina, shell circular, beaks depressed, 61, 62.

Loripes, shell circular, lateral teeth remote and indistinct, 63, 64.

Diplodonta, ligament wholly external, 65.

Axinus, shell globular, posterior side angulated, 66-68.

Montacuta, shell minute, thin, oblong, anterior side the longer, ligament internal, 69-72.

Lyonsiidæ. (EULAMELLIBRANCHIATA.) Plate xv.

Lyonsia, 173.

Mactridæ. (EULAMELLIBRANCHIATA.) Plate ix.

Amphidesma, teeth of unequal size in both valves, 107.

Mactra, teeth of unequal size in right valve only, 108-112.

Marginellidæ. (PROSOBRANCHIATA.) Plate xxix.

Marginella, 529.

Muricidæ (PROSOBRANCHIATA.) Plate xxvi.

Trophon, canal open throughout, outer lip not notched within, 503-505.

Lachesis, canal open throughout, outer lip notched within, canal short and wide, 510.

Murex, canal covered over, 506, 507.

Purpura, pillar flattened, sloping inwards with a sharp edge, 508, 509.

Myidæ. (EULAMELLIBRANCHIATA.) Plate xii.

Mya, upright spoon-shaped cavity for cartilage, under beak of right valve, 143-145.

Corbula, right valve overlapping left, 146.

Lutraria, hinge plate projecting in the middle, 147, 148.

Mytilidæ. (FILIBRANCHIATA.) Plate ii.

Crenella, shell striated all over; hinge with an upright tooth, 24, 25.

Modiolaria, shell striated only at ends, 26-29.

Mytilus, shell oblong triangular, ending in a point and having its two extremities equal, pedal muscular impressions, two in each valve, small, simple, close to the adductors, 19-23.

Nassidæ. (PROSOBRANCHIATA.) Plate xxvi.

Nassa, 513-516.

Naticidæ. (PROSOBRANCHIATA.) Plate xxiii.

Natica, 370-376.

Neritidæ. (PROSOBRANCHIATA.) Plate xxii.

Neritina, 356.

Nuculidæ. (PROTOBRANCHIATA.) Plate i.

Nucula, shell trigonal, lunule cordate, pallial line entire, 1-4.

Leda, shell with posterior side produced, lunule lanceolate, pallial line sinuated, 5-8.

Onchidiidæ. (Pulmonata.) Plate xx.

Onchidium, 318.

Ostreidæ. (Pseudolamellibranchiata.) Plate iii.

Ostrea, 32.

Otinidæ. (Pulmonata.) Plate xvii.

Otina, 204.

Pandoridæ. (Eulamellibranchiata.) Plate xv.

Pandora, 172.

Patellidæ. (Prosobranchiata.) Plate xxi.

Patella, shell conical; crown near centre, 324.

Helcion, shell cap-shaped; crown near margin, 325.

Pectinidæ. (Pseudolamellibranchiata.) Plates iii., iv.

Pecten, 33-43.

Petricolidæ. (Eulamellibranchiata.) Plate x.

Petricola, 128.

Philinidæ. (Opisthobranchiata.) Plate xxx.

Philine, 569-576.

Pholadidæ. (Eulamellibranchiata.) Plate xiv.

Pholas, apophyses long and partly hidden within the junction; shell prickly all over, 160-163.

Pholadidea, apophyses long and partly hidden within the junction; anterior part covered with prickly ridges; posterior end with horny cup attached, 164.

Xylophaga, apophyses short and prominent, 165.

Physidæ. (Pulmonata.) Plate xvii.

Physa, 227-229.

Pleurobranchidæ. (Opisthobranchiata.) Plate xxx.

Pleurobranchus, 580, 581.

Pleurophyllidiidæ. (Opisthobranchiata.) Plate xxxii.

Pleurophyllidia, 601.

Pleurotomariidæ. (Prosobranchiata.) Plate xxi.

Scissurella, 334.

Polyceridæ. (OPISTHOBRANCHIATA.) Plate xxxiii.

Polycera, dorsal tentacles laminated and non-retractile, 604.

Ægirus, dorsal tentacles linear and retractile, oral indistinct, 605.

Triopa, dorsal tentacles laminated and retractile, oral cylindrical, 606.

Thecacera, dorsal tentacles laminated and retractile, oral none, 607.

Crimora, dorsal tentacles laminated and retractile, oral tubercular, 608.

Poromyidæ. (EULAMELLIBRANCHIATA.) Plate xv.

Poromya, shell roundish oval, 179.

Neæra, shell fig-shaped, posterior end being twisted and produced, 180-183.

Psammobiidæ. (EULAMELLIBRANCHIATA.) Plate xii.

Psammobia, 139-142.

Pupidæ. (PULMONATA). Plate xx.

Pupa, mouth oval or lunate, 288-291.

Vertigo, mouth more or less angular, 292-302.

Balea, shell sinistral, mouth ovate, 303.

Clausilia, shell sinistral, mouth with clausilium, 304-309.

Cochlicopa, mouth pyriform, 310, 311.

Pyramidellidæ. (PROSOBRANCHIATA.) Plate xxvi.

Odostomia 468-502.

Rissoidæ. (PROSOBRANCHIATA.) Plate xxiv.

Barleeia, colour red, 425.

Rissoa, colour not red, 400-424.

Runcinidæ. (OPISTHOBRANCHIATA.) Plate xxx.

Runcina, 582.

Scalariidæ. (PROSOBRANCHIATA.) Plate xxii.

Scalaria, shell turreted, longitudinally ridged, mouth almost round, 360-364.

Aclis, shell pyramidal, smooth or sculptured, mouth oval, outer lip thin, 365-369.

Scaphandridæ. (OPISTHOBRANCHIATA.) Plate xxx.

Scaphander, shell pear-shaped or oval, 558, 559.

Cylichna, shell cylindrical, 560-564.

Scrobiculariidæ. (EULAMELLIBRANCHIATA.) Plate viii.

Scrobicularia, 99-103.

Scyllæidæ. (OPISTHOBRANCHIATA.) Plate xxxii.

Scyllæa, 600.

Skeneidæ. (PROSOBRANCHIATA.) Plate xxiv.

Skenea, 434.

Solenidæ. (EULAMELLIBRANCHIATA.) Plate xiii.

Solecurtus, two cardinals in right valve, pallial scar with broad and shallow fold, 149, 150.

Ceratisolen, hinge strengthened by a rib diverging obliquely from the beak in each valve towards the front margin, 151.

Solen, pallial scar with a narrow sinus at the posterior extremity; one cardinal in the right valve, 152-155.

Stenogyridæ. (PULMONATA.) Plate xx.

Achatina, 312.

Succineidæ. (PULMONATA.) Plate xx.

Succinea, 313-317.

Tellinidæ. (EULAMELLIBRANCHIATA.) Plates vii., viii.

Tellina, two cardinals in each valve, those in the left valve of equal size, 90-97.

Gastrana, two cardinals in each valve, those in the left valve of unequal size, one being minute, 98.

Teredinidæ. (EULAMELLIBRANCHIATA.) Plate xiv.

Teredo, 166-171.

Testacellidæ. (PULMONATA.) Plate xviii.

Testacella, 230, 231.

Tornatinidæ. (OPISTHOBRANCHIATA.) Plate xxx.

Tornatinus, 551-557.

Trochidæ. (PROSOBRANCHIATA.) Plate xxii.

Trochus, 338-354.

Trichotropidæ. (PROSOBRANCHIATA.) Plate xxiii.

Trichotropis, shell conical, spire long, apex pointed, 380.

Torellia, shell globose, spire short, apex depressed, 381.

Tritonidæ. (PROSOBRANCHIATA.) Plate xxv.
Triton, 459, 460.

Tritoniidæ. (OPISTHOBRANCHIATA.) Plate xxxii.
Tritonia, 602.

Truncatellidæ. (PROSOBRANCHIATA.) Plate xxiii.
Truncatella, 399.

Turbinidæ. (PROSOBRANCHIATA.) Plate xxii.
Phasianella, 355.

Turritellidæ. (PROSOBRANCHIATA.) Plate xxv.
Turritella, 452.

Unionidæ. (EULAMELLIBRANCHIATA.) Plates vi., vii.
Unio, hinge with teeth strongly marked, lunule distinct, shell solid, 55-57.
Anodonta, teeth rudimentary or absent, lunule indistinct, shell thin, 58, 59.

Valvatidæ. (PROSOBRANCHIATA.) Plate xxiv.
Valvata, 441, 442.

Veneridæ. (EULAMELLIBRANCHIATA.) Plate ix.
Circe, three cardinals in each valve, outer one in left valve on posterior side cloven in two, 113.
Venus, pallial sinus angular, 114-121.
Lucinopsis, two cardinals only in left valve, 122.
Tapes, pallial sinus rounded, 123-126.
Venerupis, shell oblong with concentric plates, 127.

Viviparidæ. (PROSOBRANCHIATA.) Plate xxv.
Viviparus, 439, 440.

CHAPTER XII.

GENERA AND SPECIES.

THE distinctions between the genera having been given, we have here only such particulars as are needful for the identification of the species. In the concluding chapter the species will be arranged alphabetically. The dimensions are those of full-grown, well-developed examples. They do not in all cases agree with the illustrations, as most of the figures in the coloured plates were drawn from shells in the writer's possession, so as to give a better idea than usual of the sort of specimens a collector will meet with in an ordinary way. Where two dimensions are given, the first is the length.

Acera. (*BULLIDÆ*). Plate xxx.

568.	*bullata,*	1¼ in. × ⅘ in.	whorls 6, ridged at the top.

Achatina. (*STENOGYRIDÆ.*) Plate xx.

312.	*acicula,*	⅙ in. × 1/20 in.	whorls 5½, compressed and drawn out, rapidly increasing in size.

Acicula. (*ACICULIDÆ*). Plate xxiii.

398.	*lineata,*	⅛ in.	outer lip thin; inner lip spread.

Aclis. (*SCALARIIDÆ*). Plate xxii.

369.	*gulsonæ,*	1/17 in. × 1/40 in.	whorls 6 or 7, shell smooth.
366.	*ascaris,*	1/10 in. × 1/40 in.	whorls 8 or 9, shell ridged.
365.	*unica,*	⅑ in. × 1/50 in.	whorls 9 or 10, shell reticulated.
368.	*walleri,*	⅛ in. × 1/20 in.	whorls 10, shell smooth.
367.	*supranitida,*	¼ in. × 1/10 in.	whorls 12, shell smooth or ridged.

Actæon. (*ACTÆONIDÆ*). Plate xxx.

550.	*tornatilis,*	¾ in. × ⅖ in.	colour pink, with three white bands on the body whorl.

Actæonia. (*LIMAPONTIIDÆ.*) Plate xxxi.

	corrugata,	⅑ in.	head keeled at the sides.
	cocksii,	⅕ in.	head with a central black stripe.

Adeorbis. (*ADEORBIDÆ*). Plate xxiv.

438.	*sub-carinatus*,	$\frac{1}{10}$ in. × $\frac{1}{25}$ in.	shell trochiform, with a flattened base and a deep umbilicus.

Ægirus. (*POLYCERIDÆ.*) Plate xxxiii.

605.	*punctilucens*,	¾ in.	purplish brown, sprinkled with white and brown.

Æolis. (*ÆOLIDIDÆ.*) Plate xxxi.

i. Body broad, branchial processes or papillæ in many transverse rows.
ii. Branchial processes clustered, dorsal tentacles laminated, angles of foot produced.
iii. Dorsal tentacles smooth, angles of foot produced.
iv. Dorsal tentacles with a bulbous swelling.
v. Branchial processes in close set rows.
vi. Branchial processes in distant rows.
vii. Branchial processes inflated.
viii. Branchial processes in a single row on each side.

i. Body broad, branchial processes or papillæ in many transverse rows—

papillosa,	3 in.	dorsal tentacles brown, tipped with white.
glauca,	1¾ in.	dorsal tentacles red, tipped with white.
alderi,	¾ in.	dorsal tentacles bright yellow.

ii. Branchial processes clustered; dorsal tentacles laminated, angles of foot produced—

591.	*coronata*,	1 in.	dorsal tubercles yellowish, branchial processes with a white ring at the end.
	drummondi,	1½ in.	dorsal tentacles fawn coloured.
	punctata,	1 in.	dorsal tentacles yellowish, branchial processes spotted with white.
	elegans,	½ in.	dorsal tentacles drab, with white tips.

iii. Dorsal tentacles smooth, angles of foot produced—

rufibranchiata,	1 in.	body white; branchial processes rosy, tipped with white.
lineata,	1 in.	body white; branchial processes rosy, ringed with white.
gracilis,	½ in.	body white; branchial processes orange, ringed with white.
smaragdina,	½ in.	body white; branchial processes green, tipped with white.
pellucida,	⅘ in.	body white; branchial processes red, tipped with white.
landsburgi,	½ in.	body violet.

iv. Dorsal tentacles with a bulbous swelling—

alba,	$\frac{3}{4}$ in.	body white, branchial processes dark brown and white.
carnea,	$\frac{1}{2}$ in.	body flesh coloured, branchial processes rosy.
glaucoides,	$\frac{1}{2}$ in.	body white, branchial processes white, with yellow tips.

v. Branchial processes in close set rows—

peachii,	$\frac{3}{4}$ in.	body yellowish or flesh-coloured; branchial processes fawn coloured, tipped with white.
nassa,	$\frac{2}{5}$ in.	body yellowish white; branchial processes rose, tipped with white.
stipata,	$\frac{1}{4}$ in.	body yellowish green.
angulata,	$\frac{2}{6}$ in.	body pale orange.
inornata,	$\frac{1}{2}$ in.	body drab.
concinna,	$\frac{1}{2}$ in.	body white, tinged with buff; branchial processes purplish brown.
olivacea,	$\frac{1}{2}$ in.	body yellowish white, with white spots.
aurantiaca,	$\frac{1}{2}$ in.	body buff.
pustulata,	$\frac{1}{4}$ in.	body white; branchial processes pale orange, spotted with white.

vi. Branchial processes in distant rows—

couchii,	1$\frac{3}{4}$ in.	body bluish black, spotted with white.
amœna,	$\frac{1}{3}$ in.	body greenish white; branchial processes yellowish green or olive, spotted with white and brown.
northumbrica,	$\frac{1}{4}$ in.	body greenish white; branchial processes green, tipped with white.
arenicola,	$\frac{3}{4}$ in.	body white; branchial processes green and yellow.
glottensis,	$\frac{2}{5}$ in.	body greenish white; branchial processes dark green, tipped with pale orange.
cærulea,	$\frac{1}{2}$ in	body pale green; branchial processes green and blue, ringed with yellow and tipped with orange.
viridis,	$\frac{1}{3}$ in.	body white, tinged with green; branchial processes green, spotted with white.
purpurascens,	1 in.	body pink.

vii. Branchial processes inflated—

cingulata,	$\frac{2}{6}$ in.	body white; branchial processes with three brown bands.
vittata,	$\frac{1}{3}$ in.	body drab; branchial processes with brown bands, and pale yellow tips.

picta,	½ in.	body yellowish white; branchial processes spotted with brown and white.
tricolor,	1 in.	body pale yellow; branchial processes ringed with golden yellow.
farrani,	½ in.	body whitish, with orange spots.
adelaidæ,	½ in.	body orange red.
exigua,	⅕ in.	body yellowish white, mottled with brown.

viii. Branchial processes in a single row on each side—

despecta,	¼ in.	body white, with narrow green line down back.

Alderia. (*HERMÆIDÆ.*) Plate xxxi.

587. *modesta,*	½ in.	branchial processes in six or seven diagonal rows.

Amphidesma. (*MACTRIDÆ.*) Plate x.

107. *castaneum,*	½ in × ⅓ in.	margin closely toothed.

Ancula. (*GONIODORIDÆ.*) Plate xxxiii.

610. *cristata,*	½ in.	three tripinnate branchial plumes, with five linear appendages on each side.

Ancylus. (*LIMNÆIDÆ.*) Plate xvii.

205. *lacustris,*	⅒ in. × ¼ in.	beak sharp, and turning to left, mouth oblong.
206. *fluviatilis,*	¼ in. × ⅓ in.	beak blunt and turning to right, mouth oval.

Anodonta. (*UNIONIDÆ.*) Plates vi., vii.

58. *anatina,*	3½ in. × 2⅒ in.	oval, beak at a third from anterior end, scars distinct.
59. *cygnea,*	5⅓ in. × 2¾ in.	oblong, beak at a fourth from anterior end, scars indistinct.

Anomia. (*ANOMIIDÆ.*) Plate i.

9. *ephippium,*	2½ in. × 2⅓ in.	hinge plate broad, muscular scar of upper valve with impressions of three inner portions of muscle, plug cylindrical and thick.
10. *patelliformis,*	1½ in. × 1⅓ in.	hinge plate narrow, muscular scar of upper valve with impressions of two inner portions of muscle, plug pear-shaped and thin.

Antiopa. (*ÆOLIDIDÆ.*) Plate xxxi.

595. *cristata,*	1½ in.	dorsal tentacles yellow, with white tips.
hyalina,	⅗ in.	dorsal tentacles grey, spotted with brown and white.

Aplysia. (*APLYSIIDÆ.*) Plate xxx.

577. *punctata,*	$1\frac{1}{7}$ in.	mouth with the dorsal margin gently curved.
578. *depilans,*	2 in.	mouth with the dorsal margin boldly rounded.
579. *melanopus,*	2 in.	semi-oval, with faint lines diverging from the straight margin.

Aporrhais. (*APORRHAIDÆ.*) Plate xxv.

455. *pes-pelecani,*	$1\frac{4}{5}$ in.	whorls 12, angulated; the three processes of outer lip digitated.
456. *macandreæ,*	$1\frac{1}{5}$ in.	whorls 7 or 8, not angulated; the four processes of outer lip narrow and spiked.

Of 455 there is a variety—*albida*—which is whitish in colour.

Arca. (*ARCADÆ.*) Plate i.

11. *pectunculoides,*	$\frac{1}{5}$ in. × $\frac{1}{6}$ in.	posterior end broad, teeth seven or eight.
15. *nodulosa,*	$\frac{4}{5}$ in × $\frac{1}{2}$ in.	teeth less than ten, and oblique.
12. *obliqua,*	$\frac{1}{5}$ in. × $\frac{1}{7}$ in.	teeth less than twenty, and in two rows.
13. *lactea,*	$\frac{3}{5}$ in × $\frac{7}{16}$ in.	teeth less than thirty-five, and in one row.
14. *tetragona,*	$1\frac{1}{2}$ in. × $\frac{4}{5}$ in.	teeth over forty.

Arion. (*LIMACIDÆ.*) Plate xviii.

241. *ater,*	4 in.	shell consisting of loosely aggregated calcareous granules, tentacles black.
242. *bourguignati,*	$\frac{1}{4}$ in.	animal whitish grey, with lateral stripes.
243 *flavus,*	1 in.	shell white, opaque, wrinkled; animal pale grey, tentacles dark grey.
244. *hortensis,*	$1\frac{1}{2}$ in.	shell granular, in an oval mass; animal with grey stripes.
245. *sub-fascus,*	$\frac{1}{4}$ in.	shell of isolated calcareous granules; animal reddish, with two black stripes.

Of 241 there are several varieties, such as *albolateralis*, which is dark brown with white sides; *bicolor*, which is dark brown with yellowish sides; *draparnaudi*, which is dark red; *marginata*, which is black with a yellow or grey fringe to the foot; *nigrescens*, which is blackish with a red fringe to the foot; *pallescens*, which is dirty white; *reticulata*, which is reticulated with pale yellow and grey; *rufa*, which is red or brown; and *succinea*, which is amber coloured.

Of 244 there are three varieties, *grisea*, which is grey; *fasciata*, which is grey, with black bands; and *rufescens*, which is reddish, with black bands.

Of 245 there is a variety—*aurantiaca*—which is bright orange.

Assiminea. (*ASSIMINEIDÆ.*) Plate xxiv.

432. *grayana,*	$\frac{1}{7}$ in. × $\frac{1}{5}$ in.	whorls 7, suture shallow.
433. *littorina,*	$\frac{1}{16}$ in. × $\frac{1}{14}$ in.	whorls 4, suture deep.

Astarte. (*ASTARTIDÆ.*) Plate v.

50. *sulcata,*	$1\frac{1}{5}$ in. × $1\frac{1}{10}$ in.	shell ribbed, obtusely triangular.
51. *compressa,*	$\frac{1}{2}$ in. × $\frac{1}{2}$ in.	shell ribbed, acutely triangular.

52. *triangularis*, ⅛ in. × ⅛ in. smooth, or with indistinct striations, acutely triangular.

Of 50 there are eight varieties, *elliptica*, which has the dorsal slope nearly straight, *incrassata*, which is obliquely triangular; *minor*, which is very small and convex; *multicostata*, which is triangular with numerous ribs; *paucicostata*, which has only a few thick ribs; *scotica*, which has the inside margin thin and smooth; *trigona*, which is small, and markedly triangular; and *truncata*, which has the front margin nearly straight.

Of 51 there are three varieties—*globosa*, which is fairly circular, with regular ribs, *striata*, which is closely ribbed, and *nana*, which is smaller, and occasionally smooth.

Avicula. (*AVICULIDÆ.*) Plate iii.

30. *hirundo*, 1⅔ × 3 in. shell elliptical and winged, upper valve the larger.

Axinus. (*LUCINIDÆ.*) Plate vii.

66. *flexuosus*, ⅓ in. × ⅓ in. white, ligament visible outside.

67. *croulinensis*, ⅛ in. × ⅐ in. white, ligament not visible outside.

68. *ferruginosus*, ⅛ in. × ⅛ in. reddish brown.

Of 66 there is a variety—*polygona*—which has a few longitudinal ridges.

Balea. (*PUPIDÆ.*) Plate xx.

303. *perversa*, ¼ in. left handed, with a shining top whorl.

There is a variety of this—*viridula*—which is greenish white, the typical colour being yellowish brown.

Barleeia. (*RISSOIDÆ.*) Plate xxiv.

425. *rubra*, ⅗ in. whorls, with a dark band, 5½, gradually enlarging, operculum dark red.

The general colour is dark red or tawny, but there is a variety—*unifasciata*—which is whitish, and there is another—*pallida*—which is pinkish white.

Bithynia. (*HYDROBIIDÆ.*) Plate xxiv.

430. *leachii*, ¼ in. whorls 5, mouth nearly round.

431. *tentaculata*, ½ in. whorls 6, mouth oval, angular above.

Of 430 there is only one variety—*elongata*—which is smaller, with a longer spire.

Of the varieties of 431 *ventricosa* is white with swollen whorls, *decollata* has lost its upper whorls, and *excavata* has rounded whorls and a deep suture.

Buccinopsis. (*BUCCINIDÆ.*) Plate xxvii.

519. *dalei*, 1½ in. colour ivory white.

Variety—*eburnea*—shell thinner with the spire longer.

Buccinum. (*BUCCINIDÆ.*) Plate xxvii.

517. *undatum*, 3¼ in. outer lip sinuated deeply, inner lip broad.

518. *humphreysianum*, 1¾ in. outer lip sinuated slightly or not at all, inner lip imperceptible.

Of *Buccinum* there are many varieties, depending on the kind of ground on which the animal lives, and many of them are as worthy of a name of their own as those to which names have been given. Some are stout, some slender, some smoother, some smaller, some more fully coloured, and, of course, there is the usual albino. The monstrosities are interesting; one has ridges on the upper part of each whorl, another has the body whorl compressed and lengthened, so as to give the shell the shape of a volute, one has a long spire, and some have been found with two or even three opercula.

Bulimus. (*HELICIDÆ.*) Plate xix.

		Spire long ; outer lip thin and unreflected—
259. *acutus*,	⅗ in.	whorls 8 or 9, umbilicus shallow.
		Spire blunt ; outer lip thick and reflected—
260. *goodallii*,	¼ in.	whorls 7 or 8, body whorl occupying a third of shell.
261. *montanus*,	⅔ in.	whorls 6½ or 7½, umbilicus oblique and deep.
262. *obscurus*,	⅓ in.	whorls 6½, umbilicus narrow not deep, shell golden brown, thin and translucent.

Of 259 there are seven varieties—*elongata*, with a slender spire; *inflata*, which is stouter ; *bizona*, which has two dark bands on the body whorl ; *strigata*, which has white ribs and brownish streaks ; *articulata*, which has white ribs and violet streaks ; *nigrescens*, which is violet brown, paler round the umbilicus ; and *alba*, which is white. Of 261 there is but one variety, *albina*, which is also entirely white, and of 262 there is also a white variety which is known as *albinos*.

Bulla. (*BULLIDÆ.*) Plate xxx.

565. *hydatis*,	1 in.	outer lip projecting beyond crown, crown not perforated.
567. *utriculus*,	½ in.	outer lip projecting beyond crown, crown perforated.
566. *elegans*,	½ in.	outer lip not projecting beyond the crown.

Globosa is a variety of of 565 ; it is smaller, globular, and cream colour, with no greenish yellow. *Oblonga* is a variety of 567 ; it is smaller and more cylindrical.

Cadulus. (*DENTALIIDÆ.*) Plate xv.

185. *subfusiformis*,	⅐ in.	spindle-shaped and narrow, base with curved notch on each side.
186. *jeffreysii*,	⅓ in.	spindle-shaped and dilated, outer curve constricted near the end.

Cæcum. (*CÆCIDÆ.*) Plate xxv.

453. *trachea*,	⅛ in.	shell ribbed.
454. *glabrum*,	1/13 in.	shell smooth.

Calyptræa. (*CAPULIDÆ.*) Plate xxiii.

383. *chinensis*,	¾ in.	shell as broad as long, white, but generally yellowish at the point.

Capulus. (*CAPULIDÆ.*) Plate xxiii.

382. *hungaricus*,	1½ in.	shell broader than long, yellowish white to light brown, beak overhanging the posterior side.

Cardium. (*CARDIIDÆ.*) Plate xi.

		Front margin contracted—
133. *exiguum*,	½ in. × ½ in.	yellowish white, marked with brown and pink.
131. *tuberculatum*,	3⅕ in. × 3 in.	yellowish brown, tinged with red.

Hinge line angular—

129.	*aculeatum*,	$3\frac{1}{3}$ in. × $3\frac{1}{5}$ in.	ribs large and spiny.
138.	*norvegicum*,	$2\frac{1}{3}$ in. × $2\frac{2}{5}$ in.	ribs faint and smooth, and absent on sides.

Hinge line curved—

130.	*echinatum*,	$2\frac{1}{3}$ in. × $2\frac{1}{5}$ in.	ribs with triangular spines.
136.	*edule*,	$1\frac{3}{4}$ in. × $1\frac{1}{2}$ in.	ribs with crested plates.
134.	*fasciatum*,	$\frac{1}{2}$ in. × $\frac{1}{2}$ in.	ribs prickly, but flat and smooth in front.
132.	*papillosum*,	$\frac{3}{5}$ in. × $\frac{1}{2}$ in.	ribs with white tubercles.
135.	*nodosum*,	$\frac{1}{2}$ in. × $\frac{1}{2}$ in.	ribs rounded at the sides and covered with tubercles or spiny plates.
137.	*minimum*,	$\frac{2}{5}$ in. × $\frac{2}{5}$ in.	ribs flat and covered with arched scales, often in a double row.

Of 130 there are two varieties—*expansa*, which is wider, and *ovata*, which has ribs much narrower than the furrows and a nearly straight dorsal margin.

Of 132 there is a white variety—*lactea.*

Of 133 there is a variety—*subquadrata*—which is squarish in shape.

Two varieties of 134 have been named—*globosa*, which has the posterior side shorter, and *alba*, which is white.

Two varieties of 135 have also been named—*ovata*, which is wider and coarsely marked, and *rosea*, which is rosy pink.

There are two varieties of 136—*rustica*, which is brown or orange in colour, and small and thin, with the posterior side more wedge-shaped; and *crenulata*, which is more oval and has the front margin straight.

Of 138 there are three varieties—*gibba*, which is smaller and more oblique; *rotunda*, which is flatter and rounder; and *pallida*, which is pale yellow in colour.

Carychium. (*AURICULIDÆ.*) Plate xviii.

201.	*minimum*,	$\frac{1}{15}$ in.	shell transparent, whorls $5\frac{1}{2}$.

Ceratisolen. (*SOLENIDÆ.*) Plate xiii.

151.	*legumen*,	4 in. × 1 in.	shell smaller at the anterior end, and pale yellowish white.

Cerithiopsis. (*CERITHIIDÆ.*) Plate xxiv.

447.	*tubercularis*,	$\frac{1}{4}$ in.	colour brown, 2 basal ridges, 13 or 14 whorls, last whorl but one with three rows of tubercles.
448.	*barleei*,	$\frac{1}{3}$ in.	yellowish white, no basal ridges, 12 whorls, last whorl but one with three rows of tubercles.
449.	*pulchella*,	$\frac{1}{6}$ in.	yellowish brown, 4 thin ridges on the body whorl, 10 whorls, closely whorled and cancellated.
450.	*metaxa*,	$\frac{1}{4}$ in.	yellowish brown, 14 or 15 whorls, 5 thick ridges on the body whorl, and 4 on each of the other whorls.
451.	*costulata*,	$\frac{2}{5}$ in.	white, 12 whorls, longitudinal ribs prominent, sharp and curved.

There is a variety of 447—*nassa*—which is shorter and broader in proportion.

Cerithium. (*CERITHIIDÆ.*) Plate xxiv.

443. *metula*,	$\frac{4}{5}$ in.	white, mouth oblong, 18 to 20 whorls.
444. *reticulatum*,	$\frac{1}{2}$ in.	white, mouth triangular, 15 to 16 whorls.
445. *perversum*,	$\frac{1}{3}$ in.	brown, sinistral.
446. *vulgatum*,	$1\frac{1}{2}$ in.	shell grey and chocolate, with spiral nodulose ribs, a prominent row of nodules on each whorl.

There are two varieties of 444—*simplex*, in which the ridges are marked with purplish lines; and *lactescens*, which is whitish.

There is also a variety of 445—*pallescens*—which is whitish.

Chiton. (*CHITONIDÆ.*) Plate xvi.

190. *fascicularis*,	$\frac{3}{4}$ in.	girdle, broad, spinous, with whitish tufts, beaks small.
191. *discrepans*,	$1\frac{1}{4}$ in.	girdle broad, spinous, with greyish tufts, beaks sharp and projecting.
192. *hanleyi*,	$\frac{2}{5}$ in.	girdle narrow, spinous, without tufts, beaks small and pointed.
193. *cancellatus*,	$\frac{1}{4}$ in.	girdle narrow, covered with granules, beaks inconspicuous except on tail plate, colour yellowish white.
194. *cinereus*,	$\frac{1}{2}$ in.	girdle narrow, covered with granules, beaks small, colour pale yellow.
195. *albus*,	$\frac{1}{3}$ in.	girdle broad, beaded with granules, ridge sharp and conspicuous, colour yellowish white.
196. *marginatus*,	$\frac{2}{3}$ in.	girdle covered with granules, ridge prominent, beaks strong and conspicuous.
197. *ruber*,	$\frac{1}{2}$ in.	girdle broad, mealy, and covered with granules, ridge indistinct, beaks projecting, colour brown, streaked with yellow.
198. *lævis*,	$\frac{3}{4}$ in.	girdle broad, reticulated, and covered with scales.
199. *marmoreus*,	1 in.	girdle broad, membranous, and covered with scales.
200. *scabridus*,	$\frac{1}{8}$ in.	girdle narrow, colour brown, with radiating granules.

Of 190 there are two varieties—*attenuata*, which is longer and narrower, and *gracilis*, which is also larger and has a membranous girdle. Of 194 there is a variety—*rissoi*—which is pale yellow in colour, and of 197 there is also one variety—*oblonga*—which is longer and more arched. There is but one variety of 198, it is smaller and more arched, and is known as *navicula*.

Circe. (*VENERIDÆ.*) Plate ix.

113. *minima*,	$\frac{2}{5}$ in. × $\frac{1}{2}$ in.	shell with flat concentric ridges, and of many colours.

There is a variety—*triangularis*—in which the beaks are more prominent, and the sides more acute.

Clausilia. (*PUPIDÆ.*) Plate xx.

Margin of clausilium notched—

304. *biplicata*,	⅝ in.	2 folds on pillar, shell streaked.
305. *laminata*,	¾ in.	3 or 4 folds on pillar, shell smooth.

Margin of clausilium entire—

306. *rolphii*,	½ in.	4 or 5 folds on pillar, shell fusiform and streaked.
307. *rugosa*,	½ in.	3 folds on pillar, shell streaked.
308. *parvula*,	⅜ in.	3 folds on pillar, shell smooth.
309. *solida*,	1 in.	shell very narrow, tooth more than half across mouth.

Of 305 there are two varieties—*pellucida*, which is more transparent, and ***albida***, which is greenish white. Among the varieties of 307 are—*albida*, which is greenish white; ***everetti***, which is small; ***gracilia***, which is long and slender; ***tumidula***, which is short and stout; ***dubia***, which is large and stout; and *dextrorsa*, which has a dextral spire.

Clio. (*CAVOLINIIDÆ.*) Plate xxx.

584. *pyramidata*,	½ in.	5 ridges in front and one at the back.

Clione. (*CLIONIDÆ.*) Plate xxx.

585. *limacina*,	1 in.	no shell; head distinct; gills external.

Cochlicopa. (*PUPIDÆ.*) Plate xx.

310. *lubrica*,	¼ in.	mouth without teeth or folds.
311. *tridens*,	¼ in.	mouth with teeth and folds.

There are five varieties of 310—***hyalina***, which is greenish white; ***lubricoides***, which is small and slender; ***viridula***, which is also small and slender, and is greenish white; ***fusca***, which is brown; and ***ovata***, which is oval and has a shorter spire. Of 311 there is only one variety—***crystallina***—which is greenish and transparent.

Columbella. (*COLUMBELLIDÆ.*) Plate xxvi.

511. *haliæeti*,	⅓ in.	whorls 8, outer lip furrowed inside, spire turreted.
512. *nassa*,	¼ in.	whorls 5, outer lip smooth, spire tapering and not turreted.

Corbula. (*MYIDÆ.*) Plate xii.

146. *gibba*,	⅔ in.	colour yellowish or brownish white.

There is a variety—***rosea***—which has a purple streak on each side of the beaks.

Crenella. (*MYTILIDÆ.*) Plate ii.

24. *rhombea*,	⅕ in. × ⅛ in.	shell with from 12 to 15 transverse plates.
25. *decussata*,	⅛ in. × ⅐ in.	shell with 40 to 50 transverse striæ.

Crepidula. (*CAPULIDÆ.*) Plate xxiii.

384. *fornicata*,	2 in. × 1 in.	smooth, pinkish white, with radiating irregular chestnut lines often broken up into spots.

Crimora. (*POLYCERIDÆ.*) Plate xxxiii.

608. *papillata*,	$\frac{3}{5}$ in.	a ridge of yellow papillæ down each side of the back.

Cyamium. (*CARDITIDÆ.*) Plate v.

49. *minutum*,	$\frac{1}{10}$ in. × $\frac{1}{14}$ in.	colour purplish brown, teeth tinged with purple.

Cyclostoma. (*CYCLOSTOMATIDÆ.*) Plate xxiii.

397. *elegans*,	$\frac{3}{5}$ in.	pale brown, with a purple tinge, whorls $4\frac{1}{2}$, umbilicus twisted.

Cyclostrema. (*CYCLOSTREMATIDÆ.*) Plate xxi.

335. *cutlerianum*,	$\frac{1}{25}$ in.	shell globular, umbilicus exposing only base of last whorl.
336 *nitens*,	$\frac{1}{27}$ in.	shell sub-globose, umbilicus not exposing any part of the middle whorl.
337. *serpuloides*,	$\frac{1}{50}$ in.	shell depressed, umbilicus exposing the whole of the spire.

This genus was established by Captain Frederic Marryat, F.R.S., who did so much in many ways, though most people know him only by his novels.

Cylichna. (*SCAPHANDRIDÆ.*) Plate xxx.

560. *acuminata*,	$\frac{1}{7}$ in.	shell fusiform.
561. *nitidula*,	$\frac{1}{8}$ in.	shell oblong and tapering at the end, smooth and iridescent.
562. *umbilicata*,	$\frac{1}{8}$ in.	shell oblong, spirally striated, creamy and opaque.
563. *cylindracea*,	$\frac{3}{5}$ in.	shell cylindrical, outer lip straight in the middle.
564. *alba*,	$\frac{1}{3}$ in.	shell cylindrical, outer lip curved.

There is one variety of 562—*conulus*—which is longer and conical in shape; and of 563 there is a variety—*linearis*—which is shorter, with brown spiral lines at the ends.

Cypræa. (*CYPRÆIDÆ.*) Plate xxv.

457. *europæa*,	$\frac{1}{2}$ in.	shell roundish and longitudinally ribbed.

Cyprina. (*CYPRINIDÆ.*) Plate v.

53. *islandica*,	$4\frac{1}{2}$ in. × 4 in.	shell thick, colour brown.

Dendronotus. (*DENDRONOTIDÆ.*) Plate xxxii.

599. *arborescens*,	1 in.	brown, spotted with white; head-veil with four or more branched processes.

There are two varieties of this—*lactea*, which is white, and *pulchella*, which is pink.

Dentalium. (*DENTALIIDÆ.*) Plate xv.

187. *entalis*,	1½ in.	ivory white, no longitudinal striæ towards narrower end, where there is often a slit.
188. *tarentinum*,	1⅛ in.	creamy white, often pinkish at the point, longitudinal striæ along lower half, plug at posterior end, where there is never a slit.
189. *abyssorum*,	1¾ in.	white, banded with pale blue, longitudinal streaks at lower half, plug at posterior end.

Of 187 there is a variety—*annulata*—which has white rings of growth; and there is also *infundibulum*, which is shorter and more conical.

Diplodonta. (*LUCINIDÆ.*) Plate vii.

65. *rotundata*,	1 in. × 9/10 in.	white, periostracum yellowish, usually remaining only in front.

Donax. (*DONACIDÆ.*) Plate viii.

104. *vittatus*,		posterior margin obliquely truncate, longitudinal striæ crossed by transverse striæ.
105. *trunculus*,		posterior margin abruptly truncate, no transverse or concentric striæ.
106. *politus*,		smooth, inner edge not toothed.

Doris. (*DORIDIDÆ.*) Plate xxxiii.

Gills united at base, and retractile within a cavity—

repanda,	1 in.	gills 5.
millegrana,	1¼ in.	gills 6, dorsal tentacles conical.
zetlandica,	¾ in.	gills 6, dorsal tentacles linear.
testudinaria,	2 in.	gills 8.
flammea,	1 in.	gills 9, body scarlet.
tuberculata,	3 in.	gills 9, body orange or yellow.
603. *coccinea*,	½ in.	gills 10.
johnstoni,	1¾ in.	gills 15.

Gills simply pinnate, non-retractile; no oral tentacles—

oblonga,	½ in.	gills 7.
pusilla,	⅓ in.	gills 9, dorsal tentacles white.
sparsa,	¼ in.	gills 9, dorsal tentacles white, blotched with brown, and with tubercles at base.
inconspicua,	⅛ in.	gills 10.

	aspera,	⅓ in.	gills 11, white, dorsal tentacles sub-conical.
	proxima,	½ in.	gills 11, orange yellow.
	muricata,	⅓ in.	yellowish white, mantle with large close set tubercles.
	loveni,	½ in.	gills 11, yellowish white, mantle with large distant tubercles.
	ulidiana,	½ in.	gills 11, pale yellow.
	diaphana,	½ in.	gills 11, white, dorsal tentacles linear.
	depressa,	⅓ in.	gills 11, light brown, spotted with reddish brown.
	bilamellata,	1½ in.	gills 20 to 29.

Gills united at base, non-retractile—

	quadrangulata,	1 in.	gills 7, dorsal tentacles in smooth sheaths.
	pilosa,	1¼ in.	gills 7 to 9, dorsal tentacles in toothed sheaths.

Doto. (*DOTONIDÆ.*) Plate xxxii.

	fragilis,	1 in.	foot notched in front.
	pinnatifida,	⅖ in.	foot arched in front and rounded.
598.	*coronata*,	½ in.	tubercles of gill processes tipped with purple.
	cuspidata,	½ in.	tubercles of gill processes without purple tips.

Dreissensia. (*DREISSENSIIDÆ.*) Plate vii.

60.	*polymorpha*,	1¼ in.	shell mussel-shaped, and keeled in the middle of both valves.

Elysia. (*ELYSIIDÆ.*) Plate xxxi.

588.	*viridis*,	¾ in.	body green, with bright blue metallic spots.

There is a variety of this—*olivacea*—which is brownish, with blue and red dots, and white tips to the tentacles.

Emarginula. (*FISSURELLIDÆ.*) Plate xxi.

Beak overhanging—

330.	*rosea*,	⅙ in.	shell broader in front than behind.

Beak not overhanging—

329.	*fissura*,	⅓ in.	colour whitish, sides of slit parallel, ribs 25 to 35.
331.	*crassa*,	1 in.	white, slit wider below.
332.	*cancellata*,	½ in.	white or yellowish slit a quarter as long as shell, shell ovate, anterior slope convex, posterior slope straight, 62 to 68 radiating ribs, alternately large and small.

Embletonia. (*ÆOLIDIDÆ.*) Plate xxxi.

	pulchra,	⅕ in.	gill processes in single series, body flesh colour, spotted with white.
592.	*minuta,*	⅛ in.	gill processes in single series, body pinkish yellow.
	pallida,	⅒ in.	gill processes in double series.
	grayi,	⅛ in.	gill processes in triple series.

Eulima. (*EULIMIDÆ.*) Plate xxv.

464.	*stenostoma,*	⅓ in.	whorls 9, colour white.
466.	*bilineata,*	⅓ in.	whorls not exceeding 11, white, encircled by a pair of thin brown bands.
465.	*subulata,*	½ in.	whorls not exceeding 13, white, encircled by three pairs of thin brown bands.
463.	*distorta,*	⅕ in.	whorls not exceeding 15, white, spire curved, quite smooth.
462.	*intermedia,*	½ in.	whorls not exceeding 16, white, spire never curved, marked with faint spiral lines.
461.	*polita,*	¾ in.	whorls not exceeding 18, white, faintly cancellated, whorls nearly flat, spire occasionally curved.

Fiona. (*ÆOLIDIDÆ.*) Plate xxxii.

593.	*nobilis.*	2 in.	buff, with a brown central gland.

Fissurella. (*FISSURELLIDÆ.*) Plate xxi.

326.	*græca,*	¾ in.	yellowish white, with brownish rays.
327.	*gibba,*	½ in.	pink, with greenish rays.

Fusus. (*FASCIOLARIIDÆ.*) Plates xxvii., xxviii., xxix.

Spirally striated, but not longitudinally ridged—

526.	*jeffreysianus,*	2¼ in.	outer lip curved in the middle, canal very short.
525.	*propinquus,*	1¾ in.	spire turreted.
521.	*norvegicus,*	4¼ in.	spire short.
520.	*antiquus,*	3¼ in.	whorls 7 or 8, angulated on upper edge, canal angulated and short.
522.	*turtoni,*	4¾ in.	whorls 7 or 8, whorls angulated on upper edge, canal curved and very short.
523.	*islandicus,*	5½ in.	whorls 9, apex a bulbous point, suture broad, canal long and straight.
524.	*gracilis,*	3 in.	whorls 9, apex without bulb but twisted in front, suture narrow, canal short and curved.

Spirally striated and longitudinally ridged—

527. *berniciensis,*	3¼ in.	pinkish white, inside of outer lip grooved, pillar slightly angulated.
528. *fenestratus,*	1¾ in.	yellowish white, inside of outer lip plain, pillar sharply angulated.

Of 520 there are about a dozen monstrosities; of the varieties the chief are *alba*, which is white and much larger; *ventricosa*, which has the whorls larger; *striata*, which is ridged on the upper whorls; and *gracilis*, which is spirally ridged and more slender. Of *gracilis* (the species, not the variety) No. 524, there is a variety—*convoluta*—which is smaller and has a longer spire and deeper suture. Of 525 there is also a variety with a longer spire and smaller, this is *turrita*, which was at one time known as *Tritonium turritum.*

Galeomma. (*GALEOMMIDÆ.*) Plate vii.

80. *turtoni,*	⅖ in. × ⅕ in.	shell thin and compressed towards each end.

Gastrana. (*TELLINIDÆ.*) Plate viii.

98. *fragilis.*	1½ in. × 1 in.	ligament annulated irregularly.

Gastrochœna. (*GASTROCHŒNIDÆ.*) Plate xiv.

159. *dubia.*	⅓ in. × ⅘ in.	shell obliquely twisted from the beaks.

Geomalacus. (*LIMACIDÆ.*) Plate xviii.

246. *maculosus,*	2 in.	black, spotted with yellow; foot brown, with a light yellow sole.

Goniodoris. (*GONIODORIDÆ.*) Plate xxxiii.

609. *nodosa,*	1 in.	gills 13, pinkish or yellowish white.
castanea,	1 in.	gills 6 or 7, brown, spotted with white.

Haliotis. (*HALIOTIDÆ.*) Plate xxi.

333. *tuberculata.*	4 in.	brown and pale green, holes from 6 to 8.

Helcion. (*PATELLIDÆ.*) Plate xxi.

325. *pellucidum,*	⅗ in.	brown, with thin streaks of blue.

Helix. (*HELICIDÆ.*) Plates xix., xx.

Without umbilicus—

276. *nemoralis,*	1 in.	lips brown.
265. *aspersa,*	1⅖ in.	lips white, whorls 4½, spiral bands generally confluent, crossed by transverse patches.
273. *hortensis,*	1 in.	lips white, whorls 5½, spiral bands distinct and not crossed by transverse patches.

With umbilicus—

Over ⅓ in. across—

With labial rib—

Shell bluntly keeled—

284. *rufescens*,	½ in.	reddish brown, frequently with a white band on last whorl.

Shell without a keel—

Striped—

278. *pisana*,	¾ in.	shell with mottlings, umbilicus small and oblique.
287. *virgata*,	½ in.	shell without mottlings, umbilicus narrow and deep.

Unstriped—

266. *cantiana*,	¾ in.	shell tinged with rose, umbilicus narrow and deep.
268. *cartusiana*,	½ in.	shell horn colour, umbilicus minute.

Without labial rib—

Shell globose—

279. *pomatia*,	1¾ in.	shell large and striated, yellow, with broad bands of light brown.
264. *arbustorum*,	⅘ in.	shell striated, brown, with blackish band along the middle of each whorl.

Shell depressed, umbilicus large—

270. *ericetorum*,	⅝ in.	shell greyish with brown bands, mouth nearly circular.
277. *obvoluta*,	½ in.	shell rufous brown, mouth triangular and toothed.
275. *lapicida*,	⅔ in.	shell rufous brown, mouth oval and angulated.

Under ⅓ in. across—

Under ⅛ in. across—

280. *pulchella*,	⅒ in.	shell milky white.
281. *pygmæa*,	1/16 in.	shell pale horn colour.
285. *rupestris*,	⅑ in.	shell blackish brown.

Over ⅛ in. across—

With labial rib—

267. *caperata*,	⅓ in.	shell keeled and striped with coloured bands.
269. *concinna*,	⅖ in.	no keel and no stripes, umbilicus very large.
272. *hispida*,	⅓ in.	no keel and no stripes, umbilicus very small.
286. *sericea*,	⅓ in.	downy and granulated, greyish white, no keel and no stripes, umbilicus very small.

Without labial rib—

272. *hispida*,	⅓ in.	no keel and no stripes, umbilicus small.
286. *sericea*,	⅓ in.	no keel and no stripes, greyish white, transparent, umbilicus very small.
283. *rotundata*,	¼ in.	bluntly keeled.
271. *fusca*,	⅓ in.	wrinkled.
263. *aculeata*,	⅐ in.	raised periostracum, whorls 4 to 4½, mouth semicircular.
274. *lamellata*,	⅐ in.	raised periostracum, whorls 6, mouth crescent-shaped.
282. *revelata*,	⅓ in.	greenish, hispid, transparent, umbilicus large.

The species of *Helix* vary much in coloration, ; of many of them there are white varieties which it is not necessary to particularise. Of 265 there are varieties that are whitish or yellowish, and one that is reddish brown with a single white stripe, and there are two dwarf varieties. Of *nemoralis* and *hortensis* the varieties are too numerous to trouble about, a new one can be found in almost every parish ; *arbustorum* also varies very much in ground colour. Of 268 there is a variety *rufilabris*, which has a brown labial rib ; of 287 the most marked variety is *subglobosa*, which has a double band above the periphery, and of 267 there is *subscalaris*, which has a conical shell.

Hermæa. (*HERMÆIDÆ.*) Plate xxxi.

bifida,	1 in.	body linear.
586. *dendritica*,	⅓ in.	body ovate.

Hero. (*ÆOLIDIDÆ.*) Plate xxxi.

596. *formosa*,	1 in.	rosy, with three white lines.

Homalogyra. (*HOMALOGYRIDÆ.*) Plate xxiii.

385. *atornus*,	1/30 in.	smooth or obscurely ridged.
386. *rota*,	1/40 in.	ribbed and keeled.

Hydrobia. (*HYDROBIIDÆ.*) Plate xxiv.

429. *jenkinsii*,	⅕ in.	mouth circular.
426. *ulvæ*,	¼ in.	whorls 7 or 8, mouth oval, narrowly angulated.
427. *similis*,	⅐ in.	whorls 5 or 6, suture deep, shell oval and stout mouth oval.
428. *ventrosa*,	⅕ in.	whorls 6 or 7, suture rather deep, shell long and narrow, mouth oval.

Ianthina. (*IANTHINIDÆ.*) Plate xxii.

357. *fragilis*,	1¼ in.	outer lip entire, broad pale streak around pillar.
358. *rotundata*,	1¼ in.	outer lip entire, no streak around pillar.
359. *exigua*,	⅜ in.	outer lip indented.

Idalia. (*GONIODORIDÆ.*) Plate xxxiii.

611.	*elegans,*	$1\frac{1}{2}$ in.	white, spotted with rose; gills 18.
	leachii,	1 in.	white, centre of back with filaments; gills 11.
	aspersa,	$\frac{1}{2}$ in.	reddish or yellowish, spotted with orange and brown; gills 10.
	inæqualis,	$\frac{3}{5}$ in.	grey, speckled with yellow and brown; mouth with 4 filaments in front; gills 9.
	pulchella,	$\frac{2}{5}$ in.	pale blue, centre of back without filaments; gills 11.
	quadricornis	$\frac{2}{5}$ in.	mottled brown and white mantle, with 2 filaments in front; gills 8 or 9.

Isocardia. (*CYPRINIDÆ.*) Plate v.

54.	*cor,*	$3\frac{4}{5} \times 3\frac{4}{5}$ in.	shell globose, yellowish white, periostracum brown.

Jeffreysia. (*JEFFREYSIIDÆ.*) Plate xxiv.

435.	*diaphana,*	$\frac{1}{15}$ in.	whorls $4\frac{1}{2}$.
436.	*opalina,*	$\frac{1}{10}$ in.	whorls $3\frac{1}{2}$, shell oval and semi-transparent.
437.	*globularis,*	$\frac{1}{20}$ in.	whorls $3\frac{1}{2}$, shell globular and transparent.

Kellia. (*ERYCINIDÆ.*) Plate vii.

73.	*suborbicularis,*	$\frac{1}{2}$ in. × $\frac{1}{2}$ in.	right valve with two lateral teeth.
74.	*cycladia,*	$\frac{3}{16}$ in. × $\frac{3}{16}$ in	right valve with two lateral teeth and a cardinal.

Lachesis. (*MURICIDÆ.*) Plate xxvi.

510.	*minima,*	$\frac{1}{5}$ in.	shell ridged and cross-ribbed, apex twisted on one side.

Lacuna. (*LITTORINIDÆ.*) Plate xxiii.

Suture excavated—

394.	*tenella,*	$\frac{1}{8}$ in.	whorls 5.
392.	*crassior*	$\frac{1}{2}$ in.	whorls 6 or 7.

Suture not excavated—

395.	*puteolus,*	$\frac{1}{5}$ in.	whorls 3 or 4, umbilicus narrow.
396.	*pallidula,*	$\frac{1}{2}$ in.	whorls 3 or 4, umbilicus very wide.
393.	*divaricata,*	$\frac{1}{2}$ in.	whorls 6.

Of the three varieties of 393, *quadrifasciata* is keeled; 395 has five varieties of no importance; and 396 has three named varieties, of which the most noticeable is *patuia,* which has a flat spire.

Lamellaria. (*LAMELLARIIDÆ.*) Plate xxiii.

377.	*perspicua,*	$\frac{2}{3}$ in.	shell ear-shaped, first whorl twisted.

Lasæa. (*ERYCINIDÆ.*) Plate vii.

75.	*rubra,*	$\frac{1}{8}$ in. × $\frac{1}{10}$ in.	white, tinged with red.

There is a variety of this—*pallida*—which is tinged with yellow instead of red.

Leda. (*NUCULIDÆ.*) Plate i.

5.	*pygmæa,*	$\frac{1}{8}$ in. × $\frac{1}{12}$ in.	teeth like those of a comb, shell smooth and swollen.
6.	*lucida,*	$\frac{1}{5}$ in. × $\frac{1}{7}$ in.	teeth like those of a comb, shell ribbed and thin.
7.	*minuta,*	$\frac{1}{2}$ in. × $\frac{1}{3}$ in.	teeth like a herring bone, shell with about 30 transverse ribs, posterior slope with 2 ridges.
8.	*pernula,*	$\frac{1}{2}$ in. × $\frac{3}{8}$ in.	teeth like a herring bone, posterior slope, slight and having 3 ridges.

Lepeta. (*LEPETIDÆ.*) Plate xxi.

322.	*cæca,*	$\frac{1}{3}$ in.	white outside and inside, central scar distinct.

Lepton. (*ERYCINIDÆ.*) Plate vii.

76.	*squamosum,*	$\frac{1}{2}$ in. × $\frac{5}{8}$ in.	shell pitted, scars indistinct.
77.	*nitidum,*	$\frac{1}{8}$ in. × $\frac{1}{10}$ in.	shell pitted, scars distinct.
78.	*sulcatulum,*	$\frac{1}{16}$ in. × $\frac{1}{16}$ in.	shell grooved, hinge plate broad, faintly excavated.
79.	*clarkiæ,*	$\frac{1}{10}$ in. × $\frac{1}{12}$ in.	shell grooved, hinge plate narrow, deeply excavated

Lima. (*LIMIDÆ.*) Plate v.

46.	*subauriculata,*	$\frac{1}{7}$ in. × $\frac{1}{4}$ in.	shell equilateral, with 24 ribs.
44.	*sarsii,*	$\frac{1}{10}$ in. × $\frac{1}{8}$ in.	shell equilateral, with 25 to 30 ribs, beaks small.
45.	*elliptica,*	$\frac{1}{3}$ in. × $\frac{1}{2}$ in.	shell equilateral, with 30 to 40 ribs, beaks prominent.
47.	*loscombii,*	$\frac{1}{2}$ in. × $\frac{4}{5}$ in.	shell inequilateral and oblique, with 50 to 60 ribs, hinge nearly straight.
48.	*hians,*	1 in. × 1$\frac{1}{2}$ in.	shell inequilateral and oblique, with 50 to 60 ribs, hinge line much curved.

Limapontia. (*LIMAPONTIIDÆ.*) Plate xxxi.

589.	*nigra,*	$\frac{1}{7}$ in.	head truncated in front.
	depressa,	$\frac{2}{5}$ in.	head rounded in front.

Limax. (*LIMACIDÆ.*) Plate xviii.

234.	*flavus,*	animal 4 in.	thick, rather square, yellowish, spotted with blackish-brown; head and tentacles grey; shell $\frac{1}{3}$ in. long by $\frac{1}{4}$ in. broad; shield marked with granules.

235. *agrestis*,	animal	1½ in.	shield marked with concentric lines; shell small and oblique; keel on back set obliquely.
236. *lævis*,	,,	¾ in.	animal dark brown, tinged with violet; shell square and minute, breathing hole near centre of mantle's right margin.
237. *tenellus*,	,,	¾ in.	yellow mantle, body greenish white, head and tentacles black, shell oval, shield wrinkled, mucus yellow.
238. *arborum*,	,,	3 in.	greyish, spotted with yellowish white, central darker stripe, and a darker band on each side; shell nearly flat.
239. *maximus*,	,,	6 in.	grey, spotted and striped with black, tentacles long and purple; shell oblong; ½ in. by ⅓ in.
240. *cinereo-niger*,	,,	4 in.	breathing hole marked with darker tint than body; sole with white band in the middle.

Among the varieties of 234 are *grisea* and *suffusa*, both of which are grey, the former having brown and white tessellations.

Of 235 there are nearly a dozen varieties, *nigra* being jet black, *filans* being greyish-white, *punctata* and *nigricans* being spotted with black, *lilacina* being spotless, the usual *albida*, and *submaculata* which is streaked and spotted.

Of 236 there is but one variety—*maculata*—which is spotted dark brown.

Of 238 there are three varieties—*bettonii*, which has white and ruddy spots; *dicipiens*, which has pale spots on a dark grey ground; and *maculata*, which is spotted with black, and has a thin band on each side.

There are some nine varieties of 239, among them being *cinerea*, which is ashy with a black mantle; *ferrussaci*, which is white, with four rows of black spots; *cellaria*, which is ashy with black spots and bands; *fasciata*, which is ashy white with five whitish bands; *obscura*, which is brown; *rufescens*, which is ruddy; and *marmorata*, which is marbled with brown. Of *cinereo-niger* there is a black variety—*nigra*.

Limnæa. (*LIMNÆIDÆ.*) Plate xvii.

207. *auricularia*,	1⅛ in.	whorls 4 or 5, last whorl enlarged; spire short and acute, inner lip forming small umbilical fissure behind it.
208. *glabra*,	⅗ in.	whorls 7 or 8, spire long, mouth with broad internal white rib.
209. *glutinosa*,	½ in.	spire very short but not sunken; whorls 3 or 4, last whorl forming nearly the whole of the shell; suture shallow, mouth oval
210. *involuta*,	⅖ in.	spire very short and sunken, suture deep, mouth pyriform.
211. *palustris*,	1 in.	whorls 6 or 7, less rapidly enlarging than 213; spire long, suture deep.
212. *peregra*,	¾ in.	whorls 5, last whorl enlarged, inner lip folded on pillar and forming narrow groove.
213. *stagnalis*,	2 in.	whorls 7 or 8, last whorl enlarged, suture deep.
214. *truncatula*,	⅖ in.	whorls 5 or 6, spire long, suture very deep, umbilical fissure distinct.

There are over sixty varieties of the species of *Limnæa*, most of them differing from the type in having a larger or smaller lip and a longer or shorter spire; some are decollated, some sinistral, some white, but as a rule the differences are so slight that it has hitherto been impossible to describe them satisfactorily.

Limopsis. (*ARCADÆ.*) Plate i.

17.	*aurita,*	$\frac{1}{3}$ in. × $\frac{1}{3}$ in.	ridges of shell beaded.
18.	*borealis,*	$\frac{1}{3}$ in. × $\frac{1}{3}$ in.	ridges of shell not beaded.

Littorina. (*LITTORINIDÆ.*) Plate xxiii.

387.	*obtusata,*	$\frac{2}{3}$ in.	shell over $\frac{1}{2}$ inch long, spire depressed, colours various.
388.	*neritoides,*	$\frac{1}{4}$ in.	shell about $\frac{1}{4}$ inch long, spire pointed, colour brown.
389.	*rudis,*	$\frac{2}{3}$ in.	shell $\frac{2}{3}$ inch, spire pointed, suture distinct.
390.	*littorea,*	$1\frac{1}{4}$ in.	shell over $\frac{3}{4}$ inch, spire pointed, suture indistinct.
391.	*æstuarii,*	$\frac{2}{5}$ in.	shell under $\frac{1}{2}$ inch, spire slightly raised and compact, colour greenish brown.

Lomanotus. (*LOMANOTIDÆ.*) Plate xxxii.

597.	*marmoratus,*	$\frac{1}{2}$ in.	body drab, marbled with brown and white.
	flavidus,	$\frac{1}{4}$ in.	body pale yellow above, white below.
	portlandicus,	$1\frac{3}{4}$ in.	body white, light brown on back, and bright red in front.

Loripes. (*LUCINIDÆ.*) Plate vii.

63.	*lacteus,*	$\frac{3}{4}$ in. × $\frac{3}{4}$ in.	margin smooth and plain.
64.	*divaricata,*	$\frac{2}{5}$ in. × $\frac{2}{5}$ in.	margin finely toothed.

Lucina. (*LUCINIDÆ.*) Plate vii.

61.	*spinifer,*	1 in. × $\frac{9}{10}$ in.	hinge line an obtuse angle, inside pearly.
62.	*borealis,*	$1\frac{1}{2}$ in. × $1\frac{2}{5}$ in.	hinge line curved, inside white.

Lucinopsis. (*VENERIDÆ.*) Plate x.

122.	*undata,*	$1\frac{1}{3}$ in.	shell circular, white, yellowish at the beaks.

A variety, *æqualis*, has a squarish shell, with more prominent beaks.

Lutraria. (*MYIDÆ.*) Plate xii.

147.	*elliptica,*	$5\frac{1}{2}$ in. × 3 in.	shell elliptical.
148.	*oblonga,*	4 in. × 2 in.	shell turned up at posterior end.

Lyonsia. (*LYONSIIDÆ.*) Plate xv.

173.	*norvegica,*	$1\frac{3}{4}$ in. × $\frac{9}{10}$ in.	shell rhomboidal, cartilage golden yellow, ossicle quadrangular.

Mactra. (*MACTRIDÆ.*) Plate ix.

108.	*solida,*	$1\frac{3}{5}$ in. × $1\frac{4}{5}$ in.	white, beaks projecting slightly.
109.	*elliptica,*	$1\frac{1}{4}$ in. × $\frac{3}{4}$ in.	shell elliptical and thin, beaks not projecting.

110.	*sub-truncata*,	$1\frac{1}{10}$ in. × $\frac{3}{4}$ in.	white, angulated on both sides, striated round the beaks, which project boldly.
111.	*stultorum*,	2 in. × $1\frac{1}{2}$ in.	yellowish brown, rayed with white.
112.	*glauca*,	4 in. × 3 in.	yellowish brown and white, without rays.

Mangilia. (*CONIDÆ.*) Plate xxix.

Spire not turreted—

530.	*teres*,	$\frac{3}{5}$ in.	yellowish white with brownish spots, spire long, whorls 10.
531.	*gracilis*,	1 in.	pale purple, canal long.
532.	*leufroyi*,	$\frac{3}{5}$ in.	cream with brownish blotches, spire short, canal short, whorls 8 or 9.
533.	*linearis*,	$\frac{1}{2}$ in.	white with brown lines, spire long, canal short, whorls 8 or 9.

Spire turreted—

534.	*reticulata*,	$\frac{1}{2}$ in.	yellow mottled with brown, whorls 9 or 10, outer lip with less than 12 ridges, canal long.
535.	*purpurea*,	1 in.	brown, often mottled with a lighter colour, outer lip with more than 13 ridges, canal short.

There is a variety of 532, *carnosula*, which is rather larger and flesh colour; of 533 there is also a larger variety, *æqualis*, which is broader and has more ribs; of 534 there is a white variety, *formosa*; and of 535 there are two varieties which are smaller, one of which, *oblonga*, has the spire not turreted.

Marginella. (*MARGINELLIDÆ.*) Plate xxix.

529.	*lævis*,	$\frac{2}{5}$ in.	outer lip with many notches or teeth.

Melampus. (*AURICULIDÆ.*) Plate xvii.

202.	*bidentatus*,	$\frac{1}{4}$ in.	ivory white.
203.	*myosotis*,	$\frac{1}{3}$ in.	rufous brown or yellow, purple towards tip

Modiolaria. (*MYTILIDÆ.*) Plate ii.

26.	*marmorata*,	$\frac{1}{2}$ in. × $\frac{3}{4}$ in.	hinge toothless, shell oval.
27.	*costulata*,	$\frac{1}{5}$ in. × $\frac{2}{5}$ in.	hinge toothless, shell oblong.
28.	*discors*,	$\frac{1}{10}$ in. × $\frac{1}{6}$ in.	hinge toothed, hinge plate toothed.
29.	*nigra*,	$\frac{2}{3}$ in. × $1\frac{1}{2}$ in.	hinge toothed, hinge plate finely notched.

Montacuta. (*LUCINIDÆ.*) Plate vii.

69.	*substriata*,	$\frac{1}{8}$ in. × $\frac{1}{9}$ in.	yellowish white, hinge line slightly curved.
70.	*bidentata*,	$\frac{1}{7}$ in. × $\frac{1}{8}$ in.	milk white, hinge line nearly rectangular, scars obscure.
71.	*tumidula*,	$\frac{1}{10}$ in. × $\frac{1}{14}$ in.	yellowish brown, hinge line rectangular, beaks prominent, scars distinct.
72.	*ferruginosa*,	$\frac{1}{3}$ in. × $\frac{1}{5}$ in.	greyish white, hinge line almost straight, beaks not prominent, scars distinct.

Murex. (*MURICIDÆ.*) Plate xxvi.

506.	*erinaceus,*	2¼ in.	colour yellowish white, spire turreted.
507.	*aciculatus,*	½ in.	colour reddish brown, spire not turreted.

Mya. (*MYIDÆ*). Plate xii.

143.	*arenaria,*	4 in. × 2½ in.	gaping equally at both ends.
144.	*truncata,*	2⅔ in. × 2 in.	gaping more at posterior end, inside chalky white.
145.	*binghami,*	½ in. × ¼ in.	gaping at posterior end, inside porcellaneous.

Mytilus. (*MYTILIDÆ.*) Plate ii.

19.	*edulis,*	1⅕ in. × 2⅓ in.	hinge with from 3 to 10 teeth, beaks divergent.
20.	*modiolus,*	2½ in. × 5 in.	hinge toothless, shell oblong, beaks divergent.
21.	*barbatus,*	1 in. × 1⅘ in.	hinge toothless, shell triangular, beaks incurved and close to point, margins thick.
22.	*adriaticus,*	¾ in. × 1⅕ in.	hinge toothless, shell oval, beaks incurved and remote from point, margins thin.
23.	*phaseolinus,*	⅓ in. × ⅔ in.	hinge finely toothed, beaks incurved.

There are four varieties of 19, the most marked of which is *pellucida,* which is striped with brown and purple; of 20 there are two varieties; of 21 there is a variety which has the upper valve flat and much smaller than the other; the only variety of 22 is *ovalis,* which has an almost cylindrical shell quite two inches long.

Nassa. (*NASSIDÆ.*) Plate xxvi.

514.	*nitida,*	1 in.	spire turreted, whorls flat.

Spire not turreted—

513.	*reticulata,*	1¼ in.	whorls convex or flattened, mouth white, outer lip with teeth inside.
515.	*incrassata,*	⅗ in.	whorls angulated, mouth white or pinkish.
516.	*pygmæa,*	7/16 in.	whorls rounded, mouth brown.

Natica. (*NATICIDÆ.*) Plate xxiii.

370.	*islandica,*	1 in.	spire produced.
371.	*grœnlandica,*	⅘ in.	whorls 4 or 5, spire short, umbilicus small.
372.	*sordida,*	1⅓ in.	whorls 5 or 6, umbilicus large, spire short, mouth equal in length to two-thirds of spire, inner lip brown.
373.	*catena,*	1⅖ in.	whorls 7, and rounded, spire short, umbilicus large.
374.	*alderi,*	¾ in.	whorls 6, spire short, umbilicus small.
375.	*montacuti,*	½ in.	whorls 5 or 6, spire short, umbilicus large, inner lip white.
376.	*affinis,*	⅞ in.	spire short, umbilicus covered by a pad.

Neæra. (*POROMYIDÆ.*) Plate xv.

180. *abbreviata*,	$\frac{2}{5}$ in. × $\frac{1}{3}$ in.	hinge line obtusely angular, shell nearly transparent.
181. *costellata*,	$\frac{3}{8}$ in. × $\frac{1}{4}$ in.	hinge line straight, hinge plate narrow and slight, left valve with a small cardinal tooth.
182. *rostrata*,	$\frac{4}{5}$ in. × $\frac{7}{16}$ in.	hinge line straight, hinge plate moderately broad, no cardinal tooth.
183. *cuspidata*,	$\frac{4}{5}$ in. × $\frac{9}{16}$ in.	hinge line obtusely angular, shell opaque and noticeably inequivalve.

Neritina. (*NERITIDÆ.*) Plate xxii.

356. *fluviatilis*,	$\frac{1}{3}$ in.	whorls 3, the last exceeding two-thirds of the shell.

Nucula. (*NUCULIDÆ.*) Plate i.

Inner margin notched—

1. *sulcata*,	$\frac{3}{4}$ in. × $\frac{2}{3}$ in.	beaks not terminal, teeth 10 to 12 on anterior side, and 20 to 24 on posterior side.
2. *nucleus*,	$\frac{1}{2}$ in. × $\frac{1}{2}$ in.	beaks terminal, teeth 15 on anterior side, and 25 on posterior side.
3. *nitida*,	$\frac{1}{2}$ in. × $\frac{1}{2}$ in.	Shell shining, teeth 12 on anterior side, and 20 on posterior side, beaks prominent.

Inner margin not notched—

4. *tenuis*,	$\frac{1}{2}$ in. × $\frac{7}{16}$ in.	beaks thin, teeth 6 on anterior side, and 16 on posterior side.

Of 2 there is a variety, *radiata*, which is larger, flatter, and has radiating streaks of purple.

Odostomia. (*PYRAMIDELLIDÆ.*) Plate xxvi.

Pillar straight, shell smooth—

502. *nitidissima*,	$\frac{1}{10}$ in.	whorls 7, suture wide and deep.
501. *acicula*,	$\frac{1}{6}$ in.	whorls 8 or 9, not angulated, suture narrow.
500. *scillæ*,	$\frac{1}{3}$ in.	whorls 11 to 12, angulated, suture narrow.

Pillar straight—

Shell ribbed or reticulated—

Whorls more than 10—

497. *rufa*,	$\frac{1}{2}$ in.	whorls 10 to 13, colour drab, often blended with brown.
498. *lactea*,	$\frac{1}{3}$ in.	whorls 12, colour white, ribs curved and oblique.
499. *pusilla*,	$\frac{1}{4}$ in.	whorls 12, colour white, ribs curved, but not oblique.

Whorls less than 10—

Spire turreted—

495. *excavata,*	$\frac{1}{7}$ in.	whorls 6, white, prominent spiral ridges and raised longitudinal ribs, outer lip with four angular points, pillar with tooth.
496. *scalaris,*	$\frac{1}{4}$ in.	whorls 8, light yellow, ribs more prominent than striæ, pillar without tooth.
494. *fenestrata,*	$\frac{1}{7}$ in.	whorls 8 to 9, white, body whorl with 20 longitudinal ribs crossed by 3 spiral ridges, pillar without tooth.

Spire not turreted—

Pillar without tooth—

489. *clathrata,*	$\frac{1}{6}$ in.	whorls 6 or 7, 3 rows of ribs on body whorl.
490. *indistincta,*	$\frac{1}{6}$ in.	whorls 7 or 8, 6 to 8 rows of ribs on body whorl.

Pillar with tooth—

493. *eximia,*	$\frac{1}{17}$ in.	mouth oval, whorls 4 or 5, ribs on body whorl 15, crossed by 3.
492. *spiralis,*	$\frac{1}{8}$ in.	mouth oblong, whorls 5 or 6, ribbed lengthways above and spirally beneath.
491. *interstincta,*	$\frac{1}{8}$ in.	mouth oval, whorls 5 or 6, over 18 ribs on body whorl.

Pillar curved—

Shell turreted—

488. *decussata,*	$\frac{1}{8}$ in.	whorls 4, ribbed and spirally striated.

Whorls 5 or more—

Whorls flat—

470. *truncatula,*	$\frac{1}{6}$ in.	whorls 6 or 7, no prominent ridge bordering suture, suture channelled.

Whorls convex—

485. *obliqua,*	$\frac{1}{5}$ in.	whorls 5, swollen, basal striæ faint, umbilicus none or indistinct, mouth pear-shaped.
486. *warreni,*	$\frac{1}{10}$ in.	whorls 5, swollen, basal striæ distinct, umbilicus small but well marked, mouth pear-shaped.
481. *turrita,*	$\frac{1}{8}$ in.	whorls 5 or 6, mouth square.
483. *insculpta,*	$\frac{1}{7}$ in.	whorls 6, convex, spirally striated, suture narrow, mouth irregularly oblong.
482. *plicata,*	$\frac{1}{10}$ in.	whorls 5 or 6, shell thin and slender, spire long and finely tapering, mouth oval and angulated above.

477. *umbilicaris*,	1/10 in.	whorls 5 or 6, shell a short cone; spire short, apex inverted, mouth oval, expanding below.
474. *rissoides*,	1/8 in.	whorls 5, quickly enlarging, spire tapering to a blunt point, mouth oval.

Shell not turreted—

487. *dolioformis*,	1/14 in.	whorls 3, body whorl very round.
476. *conoidea*,	1/4 in.	whorls 8, colour ivory-white, mouth oval, outer lip with 8 or 9 grooves.
479. *conspicua*,	1/8 in.	whorls 8, colour chocolate or cream, mouth squarish, angulated below, outer lip not grooved.

Whorls 4 to 7—

484. *diaphana*,	1/10 in.	whorls 4, convex, upper part of each having a thickened rim.
469. *nivosa*	1/17 in.	whorls 4 or 5, tooth large, with umbilicus.
468. *minima*,	1/20 in.	whorls 4 or 5, mouth oval.
471. *clavula*,	1/12 in.	whorls 4 or 5, mouth oval, expanded below.
473. *albella*,	1/9 in.	whorls 5 or 6, nucleus apparent on apex of spire, tooth small, without umbilicus.
472. *lukisi*,	1/10 in.	whorls 5 or 6, mouth oval, expanded below and contracted above, spire abrupt.
480. *unidentata*	1/5 in.	whorls 6, flat, no umbilicus.
478. *acuta*,	1/6 in.	whorls 6, mouth oval, expanded below and contracted above, spire long and tapering.
475. *pallida*,	1/5 in.	whorls 6 or 7, nucleus not apparent at apex of spire, tooth small, with umbilicus.

Of some of the species of *Odostomia* there are several varieties, but none worth special mention.

Onchidium. (*ONCHIDIIDÆ.*) Plate xx.

318. *celticum*,	1/2 in.	tentacles short and conical, with bulbous tips.

Ostrea. (*OSTREIDÆ.*) Plate iii.

32. *edulis*,	3½ in. × 3 in.	beaks small, lateral edges toothed or notched.

Otina. (*OTINIDÆ.*) Plate xvii.

204. *otis*,	1/10 in.	shell earshaped, thin and transparent, whorls 2.

Ovula. (*CYPRÆIDÆ.*) Plate xxv.

458. *patula*,	1 in.	upper canal semi-tubular, lower canal short and broad.

Pandora. (*PANDORIDÆ.*) Plate xv.

172. *inæquivalvis*,	1¼ in. × 3/5 in.	right valve overlapping left.

Panopæa. (*GLYCIMERIDÆ.*) Plate xiv.

158. *plicata*, $\frac{2}{5}$ in. × $\frac{1}{4}$ in. shell with a long gape at the posterior end.

Patella. (*PATELLIDÆ.*) Plate xxi.

324. *vulgata*, $1\frac{1}{2}$ in. shell a raised cone with radiating ribs.

Of the five varieties of 324, *picta* is streaked with red and dark blue, *intermedia* has an orange crown, *depressa* is rather flat and has the beak near to the anterior end, and *cærulea* is dark blue inside.

Pecten. (*PECTINIDÆ.*) Plate iii.

33. *pusio*, $1\frac{3}{4} \times 1\frac{2}{3}$ in. right hand ear of lower valve notched at base, 50 or more narrow ribs, alternately large and small.
34. *varius*, $1\frac{2}{3} \times 1\frac{4}{5}$ in. right hand ear of lower valve notched at base, 25 to 30 equal sized prickly ribs.
35. *opercularis*, $2\frac{1}{2} \times 2\frac{1}{3}$ in. ears nearly equal, 20 rounded ribs.
36. *septemradiatus*, $1\frac{1}{2} \times 1\frac{1}{3}$ in. right hand ear the larger, 7 rounded ribs, middle one the largest.
37. *tigrinus*, $\frac{4}{5}$ in. × $\frac{9}{10}$ in. striated, purple streaked and blotched, right hand ear of lower valve the larger.
38. *testæ*, $\frac{1}{2}$ in. × $\frac{9}{16}$ in. apparently smooth, but really striated, left ear of upper valve deeply notched.
39. *striatus*, $\frac{3}{4}$ in. × $\frac{3}{4}$ in. finely ribbed, left ear of upper valve nearly entire.
40. *similis*, $\frac{1}{3}$ in. × $\frac{1}{4}$ in. striated and mottled, ears long and drooping and rounded at the corner.
41. *aratus*, $\frac{5}{8}$ in. × $\frac{3}{4}$ in. ears large, 32 rounded ribs with thin plates in interstices, inside furrowed.
42. *vitreus*, $\frac{1}{3}$ in. × $\frac{2}{5}$ in. striated, ears broadly triangular, except the right one of lower valve, which is irregular.
43. *maximus*, 5 in. × $4\frac{1}{2}$ in. upper valve nearly flat, and concave towards the beak.

There is a white variety of 34, *nivea*; and there is a white variety of 35, *lineata*; the latter having a thin brown line down the ridge of each rib; of 36 there is also a white variety. No. 43 is not the scallop shell of the pilgrims, that species has the ribs of the lower valve angulated instead of round. The other varieties are of no importance.

Pectunculus. (*ARCADÆ.*) Plate i.

16. *glycimeris*, $2\frac{1}{4}$ in. × $2\frac{1}{4}$ in. shell round and white, zigzagged with browns and purples.

Petricola. (*PETRICOLIDÆ.*) Plate x.

128. *pholadiformis*, $1\frac{1}{2}$ in. × $\frac{3}{4}$ in. thin, tumid, anterior side short.

Phasianella. (*TURBINIDÆ.*) Plate xxii.

355. *pulla*, $\frac{1}{4}$ in. × $\frac{1}{3}$ in. many coloured, pointed at both ends, spire short, operculum white.

Philine. (*PHILINIDÆ.*) Plate xxx.

Patterned with dots or links—

569. *scabra*,	$\frac{1}{8}$ in.	whorls 3, outer lip indented in the upper part, mouth angulated.
570. *catena*,	$\frac{1}{7}$ in.	whorls 2 or 3, outer lip indented in the middle, mouth oval.
571, *angulata*,	$\frac{1}{10}$ in.	whorls 2 or 3, conspicuous and keeled, mouth square.
572. *quadrata*,	$\frac{1}{4}$ in.	whorls 2 or 3, rounded, mouth oval, top of outer lip scalloped, top of outer lip higher than spire.
573. *punctata*,	$\frac{1}{10}$ in.	whorls 2, rounded, mouth oval, top of outer lip scalloped and lower than spire.

Cancellated—

574. *pruinosa*,	$\frac{1}{4}$ in.	spire small, sunk below the crown.
575. *nitida*,	$\frac{1}{14}$ in.	spire smooth and conspicuous.
576. *aperta*,	$\frac{4}{5}$ in.	spire loosely coiled and inconspicuous.

Pholadidea. (*PHOLADIDÆ.*) Plate xiv.

164. *papyracea*,	$1\frac{1}{2}$ in. × $\frac{3}{4}$ in.	two dorsal shields, small and close to the hinge on anterior side; shell with transverse ridges on the upper half, and smooth below.

Pholas. (*PHOLADIDÆ.*) Plate xiv.

160. *dactylus*,	5 in. × $1\frac{1}{4}$ in.	four dorsal shields.
161. *candida*,	$2\frac{3}{4}$ in. × 1 in.	one dorsal shield, which is broadly lanceolate, ribs radiating from beak.
162. *parva*,	$1\frac{4}{5}$ in. × $\frac{4}{5}$ in.	one dorsal shield, which is curved and narrowly lanceolate, ribs transverse.
163. *crispata*,	$2\frac{4}{5}$ in. × $1\frac{9}{16}$ in.	one dorsal shield, which is small and triangular, ribs longitudinal.

Physa. (*PHYSIDÆ.*) Plate xvii.

227. *acuta*,	$\frac{5}{8}$ in.	whorls 3 to 5, mouth ending in a sharp angle.
228. *fontinalis*,	$\frac{1}{2}$ in.	whorls 4 to 5, spire short.
224. *hypnorum*,	$\frac{3}{4}$ in.	whorls 6 to 7, spire long.

Pinna. (*AVICULIDÆ.*) Plate iii.

31. *rudis*,	15 in.	fan-shaped, surface minutely punctured; hinge plate folded over the ligament.

Pisidium. (*CYRÆNIDÆ.*) Plate vii.

85. *amnicum*,	$\frac{2}{5}$ × $\frac{1}{3}$ in.	shell triangular, inequilateral, with the anterior side the longer.
86. *fontinalis*,	$\frac{1}{6}$ × $\frac{1}{7}$ in.	shell triangular, striated concentrically, posterior side much produced and rounded.

87. *nitidum*,	$\frac{1}{7} \times \frac{1}{7}$ in.	shell round, anterior side truncate and rounded, posterior side produced and sloping abruptly.
88. *pusillum*,	$\frac{1}{5} \times \frac{1}{6}$ in.	shell oval, both sides rounded and compressed.
89. *roseum*,	$\frac{1}{7} \times \frac{1}{10}$ in.	shell oblong, anterior side truncate and sloping abruptly below, posterior side produced and rounded.

There are varieties of all the species of *Pisidium* except *roseum*, the most marked being ***henslowana*** of 86, which has a plate-like appendage to the beaks.

Planorbis. (*LIMNÆIDÆ.*) Plate xvii.

Last whorl embracing the rest—

222. *lineatus*,	$\frac{1}{6}$ in.	whorls 4, septa in last whorl.
224. *nitidus*,	$\frac{1}{6}$ in.	whorls 4 or 5, thin, shining, compressed, keeled in middle.

Last whorl not embracing the rest—

Whorls rounded—

215. *albus*,	$\frac{1}{4}$ in.	whorls 5, shell small, greyish white, covered with longitudinal striæ; last whorl large.
218. *contortus*,	$\frac{1}{5}$ in.	shell small, thick, whorls 8, compact, mouth semilunar; umbilicus large and deep.
219. *corneus*,	1 in.	whorls 5 or 6, rounded above and below, suture deep, mouth narrow and crescent shaped; umbilicus large and deep.
221. *glaber*,	$\frac{1}{7}$ in.	whorls 5, last whorl large; shell convex above, concave below; smooth, no circular striæ; umbilicus large.

Whorls keeled or angulated—

216. *carinatus*,	$\frac{1}{2}$ in.	whorls 5 or 6, keel in middle of whorls, last whorl large, mouth obliquely oval.
217. *complanatus*,	$\frac{3}{4}$ in.	whorls 5 or 6, keel on lower side of whorls, last whorl large, mouth rhombic.
220. *dilatatus*,	$\frac{1}{10}$ in.	whorls 2, angulated, mouth very large and squarish, umbilicus small and deep.
223. *nautileus*,	$\frac{1}{10}$ in.	whorls 3, last whorl rather large, small imbricated ridge, mouth oval, umbilicus large.
225. *spirorbis*,	$\frac{1}{4}$ in.	whorls 5 or 6, one side concave the other flat, keel frequently blunt, mouth roundish, often ribbed with white, umbilicus wide and shallow.
226. *vortex*,	$\frac{3}{8}$ in.	whorls 6 to 8, upper side concave, underside flat, keel on the lower margin and always well marked, mouth rhombic, umbilicus large and shallow.

Among the noticeable varieties of *Planorbis*, are *cristata* of 223, in which the periphery is deeply notched; *compressa* of 221, which is only depressed in the centre on the upper side; and *compressa* of 226, which has the keel nearly in the middle of the periphery. Nearly every species has a white variety.

Pleurobranchus. (*PLEUROBRANCHIDÆ.*) Plate xxx.

580.	*membranaceus*,	2 in.	shell ear-shaped, membranous, outer margin dilated.
581.	*plumula*, .	⅗ in.	shell oblong, corneous, outer margin straight.

Pleurophyllidia. (*PLEUROPHYLLIDIIDÆ.*) Plate xxxii.

601.	*loveni*,	1 in.	brown, with thin white stripes and black specks, gills and tentacles yellowish.

Pleurotoma. (*CONIDÆ.*) Plate xxix.

Whorls rounded—

549.	*trevelyana*,	⅕ in.	white, spire turreted.
543.	*lævigata*,	⅒ in.	yellow, with chocolate margins, spire not turreted.

Whorls angulated—

Spire turreted—

539.	*rugulosa*,	⅛ in.	yellowish, with or without brown bands, whorls 7, canal truncated, outer lip without ledge.
541.	*galerita*,	⅜ in.	grey, conical and rather stout, whorls 7.
547.	*rufa*,	⅕ in.	purplish brown, whorls 7.
548.	*turricula*,	¼ in.	white, whorls 7 or 8.
540.	*brachystoma*,	⅒ in.	yellowish white or reddish brown, whorls 8 or 9, labial notch on the ledge at the top of the body whorl.
536.	*striolata*,	⅗ in.	buff, with or without brown bands, whorls 9.
542.	*nebula*,	⅕ in.	chocolate, whorls 10 or 11.

Spire not turreted—

537.	*attenuata*,	⅕ in.	dark yellow with brown lines, whorls 9 or 10, canal straight.
538.	*costata*,	½ in.	yellow and brown, whorls 9 or 10, canal curved.
544.	*nivalis*,	¼ in.	white, whorls 10, labial notch below the junction of the outer lip with the periphery.
545.	*carinata*,	¼ in.	white, whorls 9, keeled, labial notch half way along the space above the keel.
546.	*septangularis*,	⅕ in.	reddish brown, whorls 8 or 9, coarsely ribbed.

There are several varieties, none sufficiently distinctive except perhaps *cranchii* of 547, which has twisted ribs.

Polycera. (*POLYCERIDÆ.*) Plate xxxiii.

604.	*quadrilineata,*	$\frac{3}{4}$ in.	white, occasionally spotted with black.
	ocellata,	$\frac{1}{2}$ in.	black, spotted with white.
	lessoni,	$\frac{1}{2}$ in.	green or yellow, with yellow tubercles.

Poromya. (*POROMYIDÆ.*) Plate xv.

179.	*granulata,*	$\frac{1}{3}$ in. × $\frac{1}{3}$ in.	inside pearly and lineated, scars triangular

Proctonotus. (*ÆOLIDIDÆ.*) Plate xxxi.

594.	*mucroniferus,*	$\frac{1}{2}$ in.	gill processes ovate and mucronated, and white with yellow gland in centre.

Propilidium. (*LEPETIDÆ.*) Plate xxi.

323.	*ancyloides,*	$\frac{1}{10}$ in.	oval with compressed sides, thin laminar partition in interior, opening towards the anterior half.

Psammobia. (*PSAMMOBIIDÆ.*) Plate xii.

136.	*tellinella,*	$1\frac{1}{8}$ in. × $\frac{3}{5}$ in.	yellowish white with violet and pink, finely striated behind.
140.	*costulata,*	$\frac{3}{4}$ in. × $\frac{1}{2}$ in.	yellowish white with purple, strongly ribbed behind.
141.	*ferroensis,*	$1\frac{4}{5}$ in. × 1 in.	pink with yellow and white.
142.	*vespertina,*	$2\frac{1}{4}$ in. × $1\frac{1}{4}$ in.	yellowish white with brown and lilac.

Puncturella. (*FISSURELLIDÆ.*) Plate xxi.

328.	*noachina,*	$\frac{1}{3}$ in.	beak twisted to the left, slit lanceolate, covered internally by a sheath.

Pupa. (*PUPIDÆ.*) Plate xx.

288.	*marginata,*	$\frac{3}{5}$ in.	mouth with 1 tooth, a white rib behind the outer lip, suture deep.
291.	*umbilicata,*	$\frac{1}{25}$ in.	mouth with 1 tooth, suture shallow and oblique.
289.	*ringens,*	$\frac{1}{7}$ in.	mouth with 5 folds.
290.	*secale,*	$\frac{1}{3}$ in.	mouth with 8 or 9 teeth, 2 or 3 on the pillar, 2 on the pillar lip and 4 inside the outer lip.

Purpura. (*MURICIDÆ.*) Plate xxvi.

508.	*lapillus,*	$1\frac{1}{4}$ in.	whorls 6 or 7, mouth oval, canal deep, with a corresponding notch outside.
509.	*hæmastoma,*	1 in.	orange coloured mouth and 2 rows of tubercles.

Rissoa. (*RISSOIDÆ.*) Plate xxiv.

Outer lip plain—

Shell smooth—

420. *pulcherrima*,	1/14 in.	white, with 4 rows of brown spots on body whorl; whorls 4.
421. *fulgida*,	1/3 in.	cream, with 2 brown bands on body whorl, whorls 4.
422. *soluta*,	1/20 in.	pale yellow, whorls 5, finely striated.
418. *proxima*,	1/7 in.	white, whorls 6, finely striated and lustrous.
419. *vitrea*,	1/7 in.	white, smooth and dull; whorls 6.
423. *semistriata*,	1/10 in.	white, with a row of brown streaks, whorls 6.
424. *cingillus*,	1/6 in.	white, with 2 brown bands on body whorl, whorls 6 or 7.

Outer lip thickened and reflected—

Shell ribbed lengthways—

409. *zetlandica*,	1/8 in.	outer lip toothed, 16 ribs on body whorl.
410. *costata*,	1/8 in.	outer lip sinuated, 9 ribs on body whorl.

Outer lip ribbed—

Shell cancellated—

407. *punctura*,	1/10 in.	punctured and prickly at angles of intersection, colour white, often spotted with brown.
405. *cimicoides*,	1/7 in.	outer lip toothed, whorls angulated.
400. *striatula*,	1/5 in.	shell turreted, spire pointed, suture shallow.
406. *jeffreysi*,	1/10 in.	shell turreted, spire blunt and slightly truncated, suture deep and channelled.
402. *cancellata*,	1/6 in.	cancellations coarse, 16 ribs on body whorl, suture broadly excavated.
403. *calathus*,	1/7 in.	cancellations minute, longitudinal striæ as prominent as transverse striæ; shell conical, spire acute.
404. *reticulata*,	1/7 in.	longitudinal striæ faintly marked, shell oblong, spire acute.
401. *lactea*,	1/4 in.	shell oval, spire abruptly pointed, suture narrow and distinct, 20 ribs on body whorl.
408. *abyssicola*,	1/12 in	shell oval, spire short and abrupt, suture deep and channelled, whorls 5.

Outer lip ribbed—

Shell ribbed and spirally striated—

416. *costulata*,	1/5 in.	striæ punctured, suture deep, whorls 8, colour buff, with brown and lilac.
413. *albella*,	1/7 in.	spire with a sharp point, suture very deep.
417. *striata*,	1/8 in.	spire with a blunt point, suture deep.
415. *violacea*,	1/5 in.	spiral striæ punctured, suture narrow.

411.	*parva*,	$\frac{1}{6}$ in.	spire short, point blunt, spiral striæ not punctured, suture narrow, no umbilicus.
412.	*inconspicua*,	$\frac{1}{12}$ in.	spire short and acute, spiral striæ not punctured, tip of the spire pink, suture shallow, umbilicus small.
414.	*membranacea*,	$\frac{1}{3}$ in.	spiral striæ not punctured, tip of spire not pink, suture narrow, umbilicus small or absent.

Runcina. (*RUNCINIDÆ.*) Plate xxx.

582.	*hancocki*,	$\frac{1}{5}$ in.	colour black, with buff ends; eyes large, surrounded by a pale ring.

Saxicava. (*GLYCIMERIDÆ.*) Plate xiv.

156.	*norvegica*,	3 in. × 2 in.	shell oval, hinge line straight.
157.	*rugosa*,	$1\frac{2}{5}$ in. × $\frac{3}{5}$ in.	shell oblong, hinge line curved.

Scalaria. (*SCALARIIDÆ.*) Plate xxii.

360.	*turtonæ*,	$1\frac{3}{4}$ in.	yellowish brown, ribs flat.
361.	*communis*,	$1\frac{1}{2}$ in.	cream, ridges raised.
362.	*trevelyana*,	1 in.	fawn, ridges narrow, flat and white.
363.	*clathratula*,	$\frac{3}{5}$ in.	white, ribs thin.
364.	*pseudoscalaris*,	1 in.	cream, ridges raised sharply, basal keel.

Scaphander. (*SCAPHANDRIDÆ.*) Plate xxx.

558.	*lignarius*,	$2\frac{1}{3}$ in. × $1\frac{1}{2}$ in.	shell striated.
559.	*librarius*,	$\frac{3}{4}$ in. × $\frac{1}{2}$ in.	shell with fine spiral, distinctly punctured grooves.

Scissurella. (*PLEUROTOMARIIDÆ.*) Plate xxi.

334.	*crispata*,	$\frac{1}{12}$ in.	whorls 4, flattened above, slit in margin of outer lip.

Scrobicularia. (*SCROBICULARIIDÆ.*) Plate viii.

103.	*piperata*,	2 in. × $1\frac{1}{2}$ in.	no lateral teeth.
99.	*prismatica*,	$\frac{4}{5}$ in. × $\frac{2}{5}$ in.	muscular scars irregular and indistinct, shell oblong.
100.	*nitida*,	$\frac{4}{5}$ in. × $\frac{1}{2}$ in.	muscular scars oval and distinct, shell oval.
101.	*alba*,	$\frac{4}{5}$ in. × $\frac{1}{2}$ in.	inner edge toothed, shell oval.
102.	*tenuis*,	$\frac{2}{5}$ in. × $\frac{1}{3}$ in.	inner edge bevelled and sharp, shell triangular.

Scyllæa. (*SCYLLÆIDÆ.*) Plate xxxii.

600.	*pelagica*,	$1\frac{1}{2}$ in.	cream and transparent, height greater than breadth.

Siphonodentalium (*DENTALIIDÆ.*) Plate xv.

184. *lofotense,*	$\frac{1}{5}$ in.	shell tapering, base with 4 notches.

Skenea. (*SKENEIDÆ.*) Plate xxiv.

434. *planorbis,*	$\frac{1}{16}$ in.	umbilicus a wide funnel showing the interior of the spire.

Solecurtus. (*SOLENIDÆ.*) Plate xiii.

146. *candidus,*	2 in. × $\frac{9}{10}$ in.	yellowish white, cardinal teeth blunt.
150. *antiquatus,*	$2\frac{1}{4}$ in. × 1 in.	chalky white, cardinal teeth jagged at their crowns.

Solen. (*SOLENIDÆ.*) Plate xiii.

152. *pellucidus,*	$1\frac{1}{2}$ in. × $\frac{2}{5}$ in.	shell curved and thin.
153. *ensis,*	$3\frac{3}{4}$ in. × $\frac{1}{2}$ in.	shell curved and tubular.
154. *siliqua,*	8 in. × 1 in.	shell straight and tubular, hinge with cardinal and lateral teeth.
155 *vagina,*	5 in. × $\frac{7}{8}$ in.	shell straight and tubular, hinge with one tooth in each valve.

Sphærium. (*CYRÆNIDÆ.*) Plate vii.

81. *corneum,*	$\frac{2}{5}$ in. × $\frac{3}{10}$ in.	yellowish horn-colour with faint concentric bands.
82. *lacustre,*	$\frac{2}{5}$ in. × $\frac{3}{10}$ in.	yellowish white or ashy grey, thin, compressed, sides truncated and sloping from dorsal margin.
83 *ovale,*	$\frac{3}{5}$ in. × $\frac{2}{5}$ in.	drab or yellowish, anterior side rounded, posterior side truncated.
84. *rivicola,*	$\frac{9}{10}$ in. × $\frac{7}{10}$ in.	horn-colour with dark concentric bands and deep ridges, ligament very conspicuous.

Spirialis. (*LIMACINIDÆ.*) Plate xxx.

583. *retroversus,*	$\frac{1}{16}$ in.	shell silvery, almost transparent, and very thin.

Stilifer. (*EULIMIDÆ.*) Plate xxv.

467. *turtoni,*	$\frac{1}{7}$ in.	spire in two parts, a cylinder and a point.

Succinea. (*SUCCINEIDÆ.*) Plate xx.

317. *virescens,*	$\frac{1}{2}$ in.	greenish yellow, pillar whitish.
315. *pfeifferi,*	$\frac{9}{16}$ in.	whorls 3, shell curved at the ends.
314. *oblonga,*	$\frac{1}{4}$ in.	light horn-coloured, whorls 4, suture oblique and very deep.
313. *elegans,*	$\frac{3}{5}$ in.	oblong, amber-coloured, whorls 3 or 4, suture very oblique but not deep.

316. *putris*,	$\frac{3}{5}$ in.	oval, whorls 3 or 4, mouth oval and two-thirds length of shell, suture rather oblique and very deep.

There are over twenty named varieties of the species of *Succinea*, but none of them differ conspicuously from the type.

Tapes. (*VENERIDÆ.*) Plate x.

123. *aureus*,	$1\frac{1}{2}$ in. × $1\frac{1}{3}$ in.	striations concentric; yellowish, streaked and blotched with brown and purple; anterior laterals sunken but distinct.
124. *virgineus*,	$1\frac{4}{5}$ in. × $1\frac{3}{5}$ in.	striations concentric; yellowish, rayed and spotted with reddish brown; laterals indistinct.
125. *pullastra*,	$1\frac{3}{4}$ in. × $1\frac{1}{2}$ in.	striations radial and faint; whitish, rayed and streaked with browns and purples; laterals ridge-like and indistinct.
126. *decussatus*,	2 in. × $1\frac{3}{4}$ in.	striations radial and strong; yellowish, with rays and streaks of brown.

Tectura. (*ACMÆIDÆ.*) Plate xxi.

319. *testudinalis*,	$\frac{3}{4}$ in.	inside pearly, central scar chocolate.
320. *virginea*,	$\frac{3}{10}$ in.	inside porcelain white, central scar white.
321. *fulva*,	$\frac{1}{6}$ in.	inside orange.

Tellina. (*TELLINIDÆ.*) Plate viii.

90. *balaustina*,	$\frac{4}{5}$ in. × $\frac{3}{4}$ in.	shell equilateral and not grooved, inside tinged with orange.
91. *crassa*,	2 in. × $1\frac{3}{4}$ in.	shell equilateral and grooved, inside tinged with rose.
92. *balthica*,	$\frac{4}{5}$ in. × $\frac{7}{10}$ in.	shell pointed at posterior end, margin rounded in front, hinge line curved.
93. *tenuis*,	1 in. × $\frac{5}{8}$ in.	shell pointed at posterior end, margin not rounded in front, hinge line angular.
94. *fabula*,	$\frac{7}{8}$ in. × $\frac{1}{2}$ in.	white, with or without a tinge of yellow.
95. *squalida*,	$1\frac{3}{4}$ in. × 1 in.	orange, often with a red mark near the beaks.
96. *donacina*,	1 in. × $\frac{3}{4}$ in.	shell angulated and thin, colour white and pink with a streak below the beak; posterior lateral removed from the beak.
97. *pusilla*,	$\frac{1}{3}$ in. × $\frac{1}{5}$ in.	shell angulated and convex, colour white and pink, with a streak below the beak.

Teredo. (*TEREDINIDÆ.*) Plate xiv.

166. *norvegica*,	sheath 12 in.	pallets large, blades wedge-shaped in front.
167. *navalis*,	sheath 6 in.	pallets small, blade forked and excavated on its outer edge.
168. *pedicellata*,	sheath $\frac{1}{4}$ in.	pallets with middle part oval, outer part square.

169. *megotara*,	sheath 6 in.	pallets oval, outside front cuneiform and excavated.
170. *malleolus*,	sheath 3 in.	pallets short with a broad blade.
171. *bipinnata*,	sheath 3 in.	pallets with funnel joints.

Testacella. (*TESTACELLIDÆ.*) Plate xviii.

230. *haliotidea*,	¼ in.	shell ear-shaped, animal yellowish brown with spots.
231. *maugei*,	¼ in.	shell cylindrical, animal dark brown.

Thecacera. (*POLYCERIDÆ.*) Plate xxxiii.

607. *pennigera*,	½ in.	white, blotched with black and orange.
virescens,	⅓ in.	pale pink, blotched with green.
capitata,	¼ in.	white, spotted with greenish brown.

Thracia. (*ANATINIDÆ.*) Plate xv.

174. *prætenuis*,	1⅓ in. × ⅞ in.	white, anterior margin semicircular.
175. *papyracea*,	1 in. × 9/16 in.	white, anterior margin gently curved.
176. *pubescens*,	3 in. × 2 in.	sandy, anterior margin gently curved.
177. *convexa*,	2½ in. × 2 in.	pale brown, margin indented on posterior side, beaks inflected to posterior side, inside yellowish.
178. *distorta*,	¾ in. × 9/16 in.	white, posterior half angulated and generally longer than anterior, beaks inflected to posterior side, inside cream colour.

Torellia. (*TRICHOTROPIDÆ.*) Plate xxiii.

381. *vestita*,	⅗ in.	white, whorls 5 or 6, rapidly increasing in size.

Tornatinus. (*TORNATINIDÆ.*) Plate xxx.

551. *mammillatus*,	1/10 in.	whorls 2 or 3, spire rimmed, pillar short and curved, fold indistinct.
552. *truncatulus*,	⅙ in.	whorls 3 or 4, spire rimmed, pillar short and flattened, fold strong.
553. *obtusus*,	⅕ in.	whorls 4, angulated at top, spire not rimmed, pillar broad and curved, fold indistinct.
554. *ventrosus*,	⅛ in.	whorls 3, angulated at top, spire flat, pillar slight and curved, fold indistinct, outer corner of mouth rounded.
555. *expansus*,	⅕ in.	whorls 3 or 4, angulated at top, spire abruptly truncated, pillar straight above and curved below, fold obscure, outer corners of mouth angulated.

556. *hyalinus*,	⅕ in.	whorls 3 or 4, angulated on top, spire truncated, pillar straight above and curved below, fold obscure, outer corner of mouth angulated, outer lip bent at a third of its length from the top.
557. *globosus*,	⅐ in.	whorls 3, tumid; spire truncated.

Trichotropis. (*TRICHOTROPIDÆ.*) Plate xxiii.

280. *borealis*,	⅗ in.	shell turreted, whorls 7, convex and ribbed, basal groove angular.

Triopa. (*POLYCERIDÆ.*) Plate xxxiii.

606. *claviger*,	¾ in.	body white, gills white, tipped with yellow.

Triton. (*TRITONIDÆ.*) Plate xxv.

459. *nodiferus*,	6 in.	whorls 8 to 10, inside of outer lip with one row of ridges.
460. *cutaceus*,	2⅗ in.	whorls 5 or 6, body whorl with crested rib, inside of outer lip with 2 rows of ridges, having excavations along the inner row.

Tritonia. (*TRITONIIDÆ.*) Plate xxxii.

602. *hombergi*,	5 in.	head veil bilobed and fringed.
alba,	¾ in.	head veil bilobed, with irregular points.
plebeia,	1 in.	head veil almost entire, with from 6 to 8 points.
lineata,	⅗ in.	head veil entire, with 4 points.

Trochus. (*TROCHIDÆ.*) Plate xxii.

Without umbilicus—

Over ¾ in.—

352. *granulatus*,	1½ in.	shell dilated and rounded at the base.
353. *zizyphinus*,	1 in.	shell regularly pyramidal.

Under ¾ in.—

351. *millegranus*,	⅗ in.	marked with rows of granules.
349. *striatus*,	⅓ in.	inside silvery, with rib near margin, suture indistinct.
350. *exasperatus*,	⅓ in.	inside silvery, with rib near margin, basal ridge encircling each whorl, suture indistinct.
348. *montacuti*,	⅓ in.	inside silvery, without rib near margin, suture distinct.

With umbilicus—

Under ¼ in.—

340. *glaucus*	⅒ in.	whorls 4.
338. *helicinus*,	⅛ in.	whorls 5, umbilicus narrow but deep.

346. *duminyi,*	1/16 in.	whorls 5; umbilicus extended over base of shell.
339. *grœnlandicus,*	1/5 in.	whorls 6.
Over 1/4 in.—		
354. *occidentalis,*		whorls 7 or 8; shell opaline and pyramidal.
341. *amabilis,*	1/3 in.	whorls 7; shell white and pyramidal.
342. *magus,*	7/8 in.	whorls 8; shell white, variegated with red, a depressed cone, thick and rounded.
343. *tumidus,*	1/3 in.	whorls 6 or 7; shell white, speckled with brown and turreted.
344. *cinerarius,*	1/2 in.	whorls 6 or 7; shell grey, finely reticulated and conical.
345. *umbilicatus,*	1/2 in.	whorls 6 or 7; shell grey with pink reticulations and conical.
347. *lineatus,*	1 in.	whorls 6; shell greenish grey with purple reticulations, thick, rounded and conical.

Trophon. (*MURICIDÆ.*) Plate xxvi.

503. *muricatus,*	5/8 in.	canal long, whorls 7 or 8, angulated and flattened above.
504. *barvicensis,*	5/8 in.	canal long, whorls 7 or 8, bearing spines above.
505. *truncatus,*	5/8 in.	canal short, whorls 6 or 7, rounded.

Truncatella. (*TRUNCATELLIDÆ.*) Plate xxiii.

399. *truncatula,*	1/6 in.	shell short, cylindrical and turreted.

Turritella. (*TURRITELLIDÆ.*) Plate xxv.

452. *terebra,*	2 1/4 in.	shell a long close spiral with an angulated base.

Unio. (*UNIONIDÆ.*) Plate vi.

55. *margaritifer,*	5 in. × 2 2/5 in.	oblong, lower margin straight.
56. *pictorum,*	3 in. × 1 1/3 in.	oblong, beaks with small tubercles not confluent, anterior teeth compressed and crenulated.
57. *tumidus,*	3 in. × 1 1/2 in.	oval, beaks with angular wrinkles, confluent and concentric, lower margin curved.

Valvata. (*VALVATIDÆ.*) Plate xxiv.

441. *cristata,*	1/8 in.	whorls 5, shell a flat coil.
442. *piscinalis,*	1/4 in.	whorls 6, shell a broad cone.

Velutina. (*LAMELLARIIDÆ.*) Plate xxiii.

378. *plicatilis,*	1/2 in.	whorls 2 1/2, sculpture indistinct.
379 *lævigata,*	4/5 in.	whorls 3 1/2, sculpture distinct.

Venerupis. (*VENERIDÆ.*) Plate x.

127 *irus,*	1 in. × 1/2 in.	shell having thin concentric ridges.

Venus. (*VENERIDÆ.*) Plate ix.

114.	*exoleta,*	2 in. × 2 in.	inside margin plain, colour yellowish white, rayed with white and pink, inside polished and freckled, with or without a purple stain.
115.	*lincta,*	$1\frac{1}{4}$ in. × $1\frac{1}{4}$ in.	inside margin plain; colour white, with yellow, brown, and pink; inside chalky white.
116.	*chione,*	3 in. × $2\frac{3}{4}$ in.	inside margin plain, colour rich pinkish brown with rays of darker brown, inside chalky white.
117.	*fasciata,*	$\frac{9}{10}$ in. × $\frac{4}{5}$ in.	inside margin notched except on the posterior side, colour pinkish with pink rays, ribs concentric and flat, margins angled.
118.	*casina,*	$1\frac{3}{4}$ in. × $1\frac{3}{5}$ in.	inside margin notched except on the posterior side, ridged with concentric plates, colour yellowish white with or without brown rays, margins rounded.
119.	*verrucosa,*	2 in. × $1\frac{4}{5}$ in.	inside margin notched except on the posterior side, coarsely ribbed concentrically, colour yellowish brown with brown rays, mouth white, inside white, margins rounded.
121.	*gallina,*	$1\frac{1}{3}$ in. × $1\frac{1}{7}$ in.	inside margin notched except on the posterior side, finely striated concentrically, colour pale brown with darker rays, margins obliquely rounded.
120.	*ovata,*	$\frac{3}{4}$ in. × $\frac{1}{2}$ in.	inside margin notched all round.

Vertigo. (*PUPIDÆ.*) Plate xx.

Shell sinistral—

293.	*angustior,*	$\frac{1}{16}$ in.	teeth 4 or 5, mouth triangular.
299.	*pusilla,*	$\frac{1}{14}$ in.	teeth 6 or 7, mouth square.

Shell dextral—

No teeth—

295.	*edentula,*	$\frac{1}{10}$ in.	faintly striated.
297.	*minutissima,*	$\frac{1}{14}$ in.	distinctly striated.

Teeth 4 or 5—

With rib—

296.	*lilljeborgii,*	$\frac{1}{14}$ in.	rib thin.
298.	*moulinsiana,*	$\frac{1}{12}$ in.	rib very stout, umbilicus open.
300.	*pygmæa,*	$\frac{1}{14}$ in.	rib very stout, umbilicus narrow.

Without rib—

292.	*alpestris,*	$\frac{1}{14}$ in.	suture very deep.

Teeth 6—

301.	*substriata,*	$\frac{1}{15}$ in.	yellowish horn-coloured, suture very deep, mouth semi-oval.
302.	*tumida,*	$\frac{1}{16}$ in.	mouth heart-shaped.
294.	*antivertigo,*	$\frac{1}{13}$ in.	mouth triangular.

Vitrina. (*HELICIDÆ.*) Plate xix.

247. *pellucida,*	$\frac{1}{4}$ in.	shell thin and green, no umbilicus.

Viviparus. (*VIVIPARIDÆ.*) Plate xxiv.

439. *contecta,*	$1\frac{1}{2}$ in.	whorls 7, much rounded; suture deep, umbilicus deep.
440. *vivipara,*	$1\frac{1}{2}$ in.	whorls $6\frac{1}{2}$, rather convex; suture shallow, umbilicus very slight.

Xylophaga. (*PHOLADIDÆ.*) Plate xiv.

165. *dorsalis,*	$\frac{2}{5}$ in. × $\frac{1}{3}$ in.	shell gaping widely anteriorly, apophysis of the right valve larger than that of the left.

Zonites. (*HELICIDÆ.*) Plate xix.

248. *draparnaldi,*	$\frac{1}{2}$ in.	whorls 6 or 7, striated transversely, fawn above, bluish white below; mouth oval and very oblique, umbilicus wide, animal cobalt blue.
257. *purus,*	$\frac{1}{10}$ in.	whorls 4, body whorl half of shell; circular striæ, umbilicus narrow and deep.
258. *radiatulus,*	$\frac{1}{8}$ in.	whorls 4 or $4\frac{1}{2}$, striæ extending from whorl to whorl and not interrupted by sutures, mouth semilunar and oblique, umbilicus moderately deep.
256. *nitidulus,*	$\frac{3}{8}$ in.	whorls 4 or 5, striæ interrupted by the sutures, spire slightly produced, mouth oblique or small.
254 *crystallinus,*	$\frac{1}{16}$ in.	whorls $4\frac{1}{2}$ to 5, body whorl same as preceding whorl, mouth lunate, umbilicus small.
255. *nitidus,*	$\frac{1}{4}$ in.	whorls 5, shell sub-globose and brownish, mouth oblique and roundish, umbilicus narrow and deep.
249. *alliarius,*	$\frac{1}{4}$ in.	whorls 5, last whorl moderately large, exposing second whorl, mouth semilunar and narrow.
254. *glaber,*	$\frac{1}{4}$ in.	whorls 5 or $5\frac{1}{2}$, body whorl occupying half of shell, which is thin, glossy, compressed, transversely striated and dark horn-coloured; mouth three-quarters of a circle, umbilicus narrow and deep.
252. *excavatus,*	$\frac{1}{4}$ in.	whorls $5\frac{1}{2}$, shell thin and horn-coloured, mouth small and lunate, umbilicus large, disclosing all the whorls.
253. *fulvus,*	$\frac{1}{10}$ in.	whorls $5\frac{1}{2}$ or 6, shell keeled and conical.
250. *cellarius,*	$\frac{3}{4}$ in.	whorls 5 or 6, last whorl large; shell pale horn-colour, mouth crescent shaped, umbilicus large, exposing second whorl.

CHAPTER XIII.

LIST OF SPECIES.

THE numbers refer to the coloured plates. The unnumbered names are those of the unfigured species of sea-slugs. The genera will be found alphabetically arranged in the preceding chapter.

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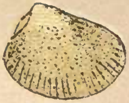
PLATE 1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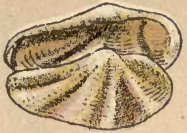
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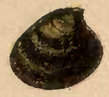
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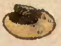
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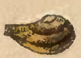
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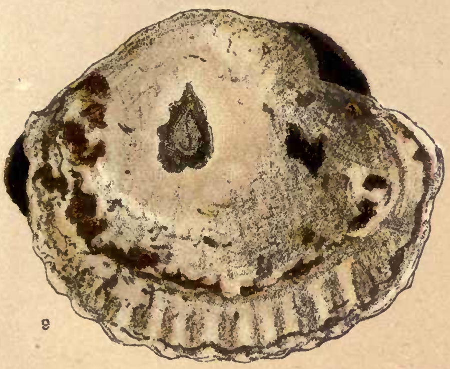
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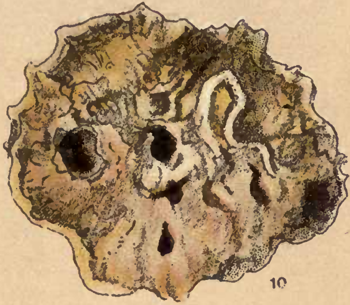
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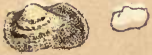
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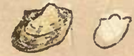
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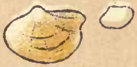
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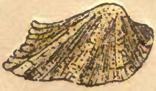
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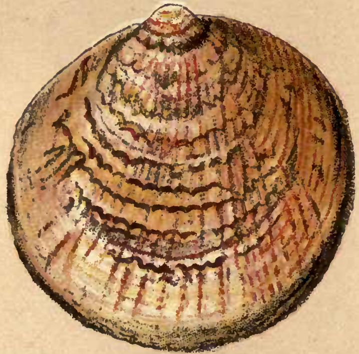
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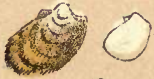
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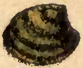
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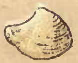
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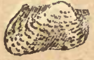
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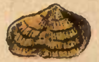
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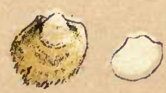
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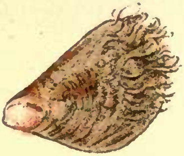
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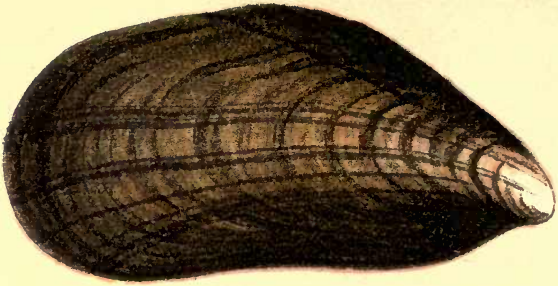
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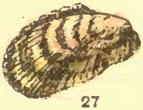
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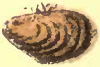
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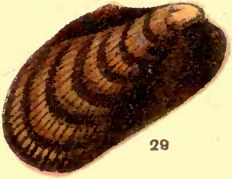
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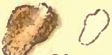
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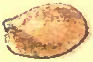
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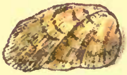
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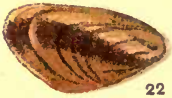
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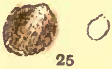
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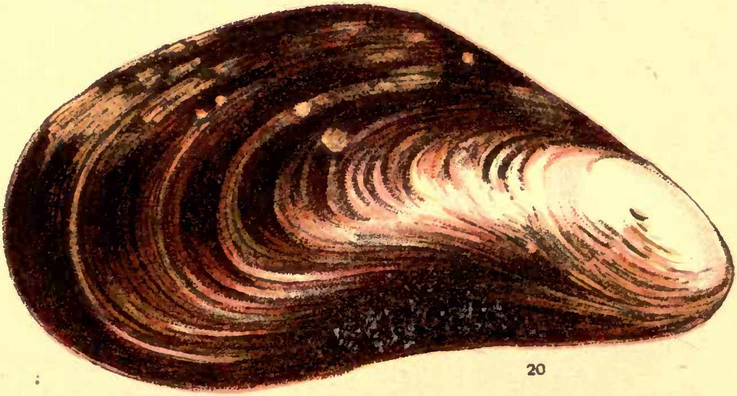
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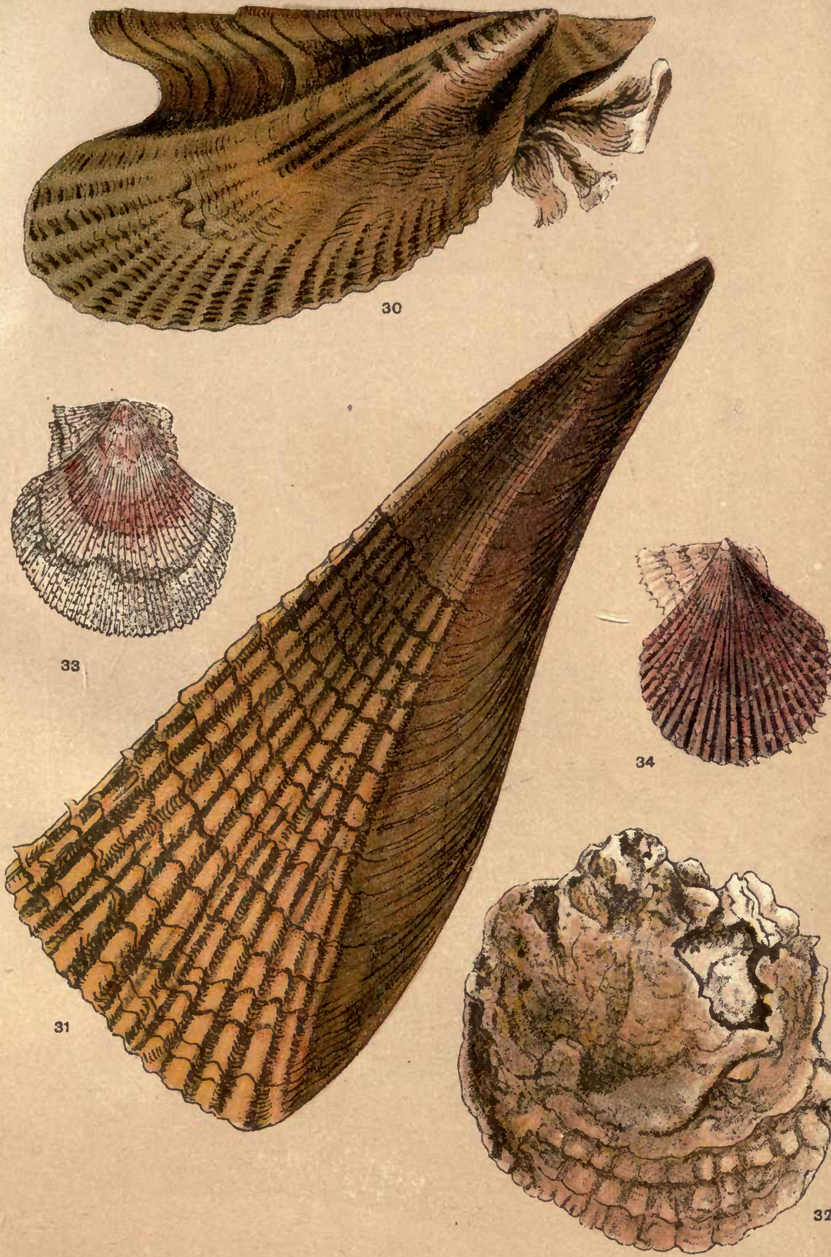
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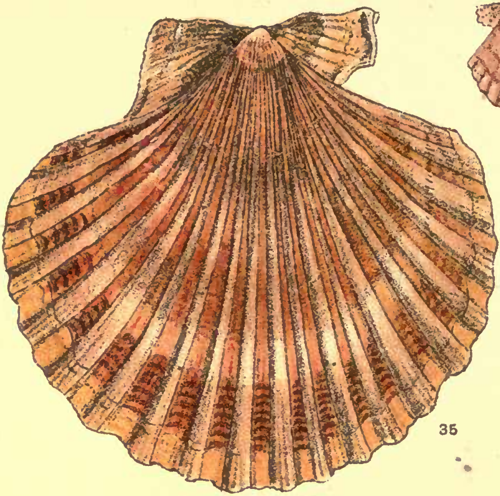
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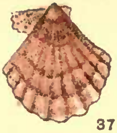
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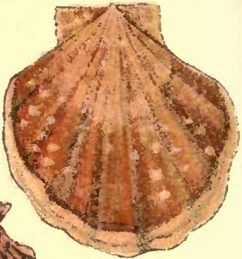
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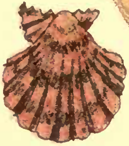
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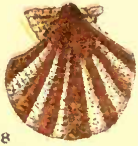
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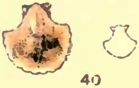
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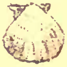
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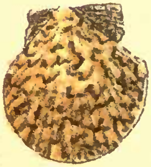
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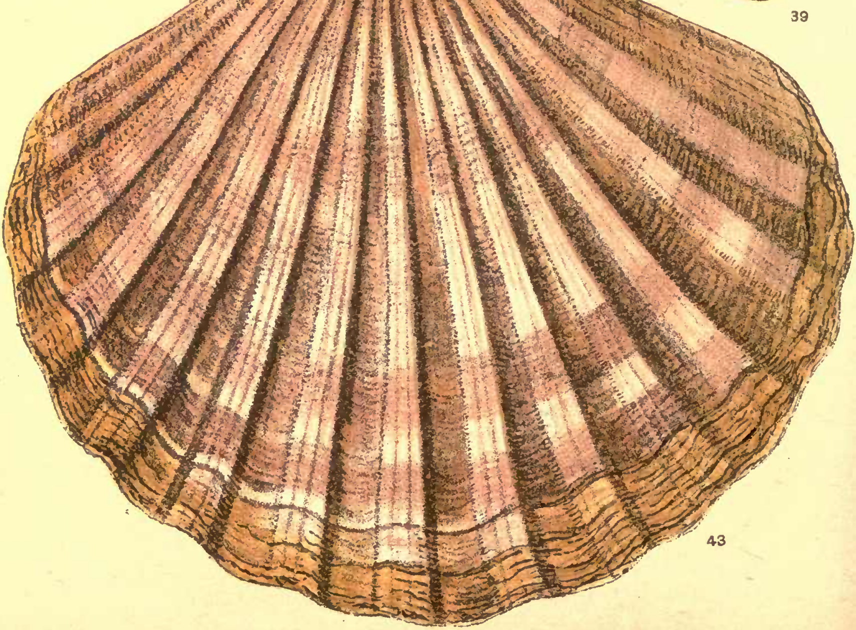
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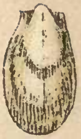
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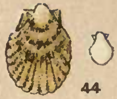
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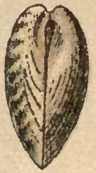
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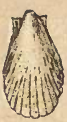
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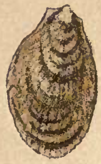
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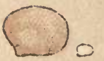
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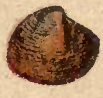
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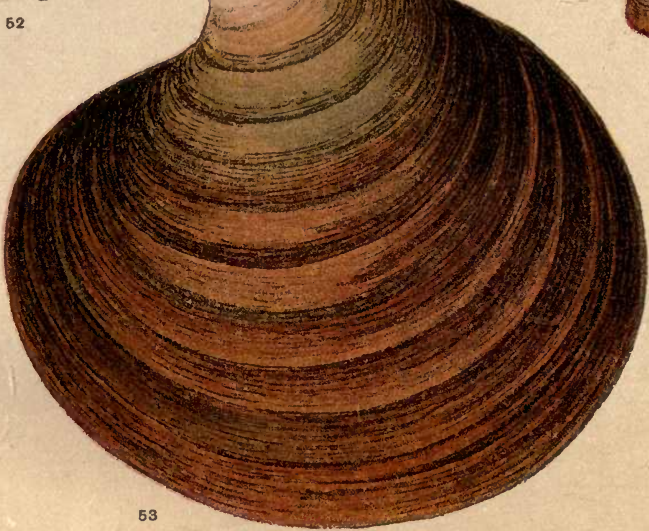
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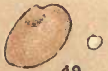
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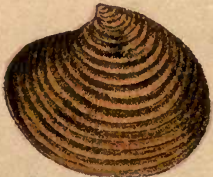
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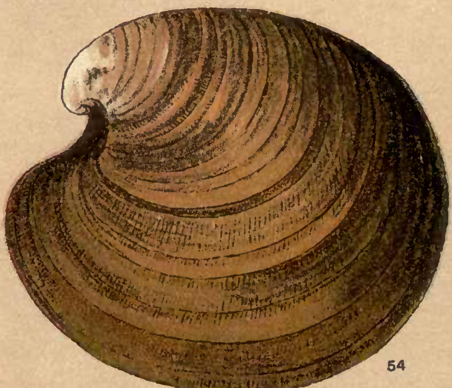
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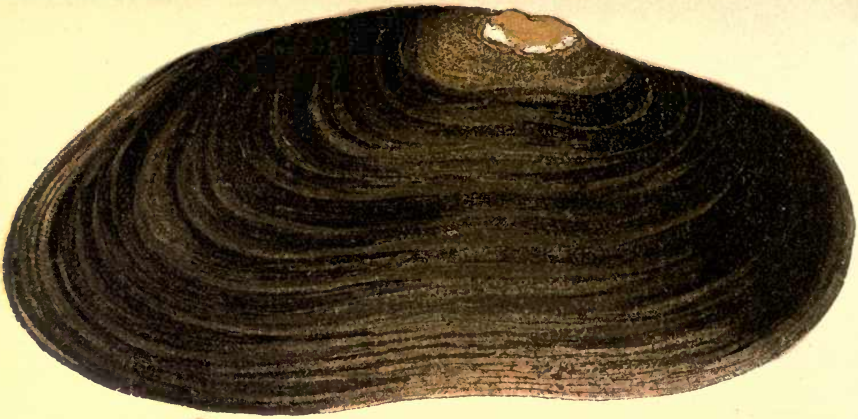

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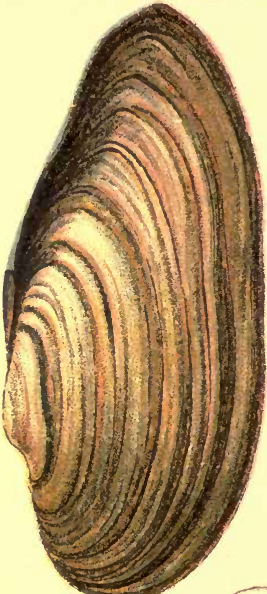

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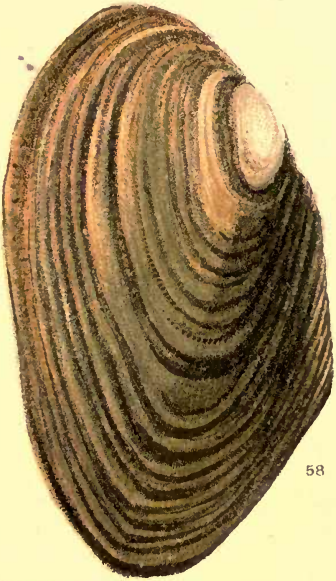

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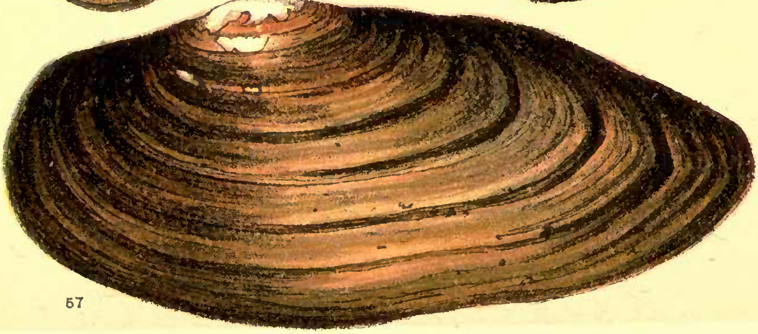

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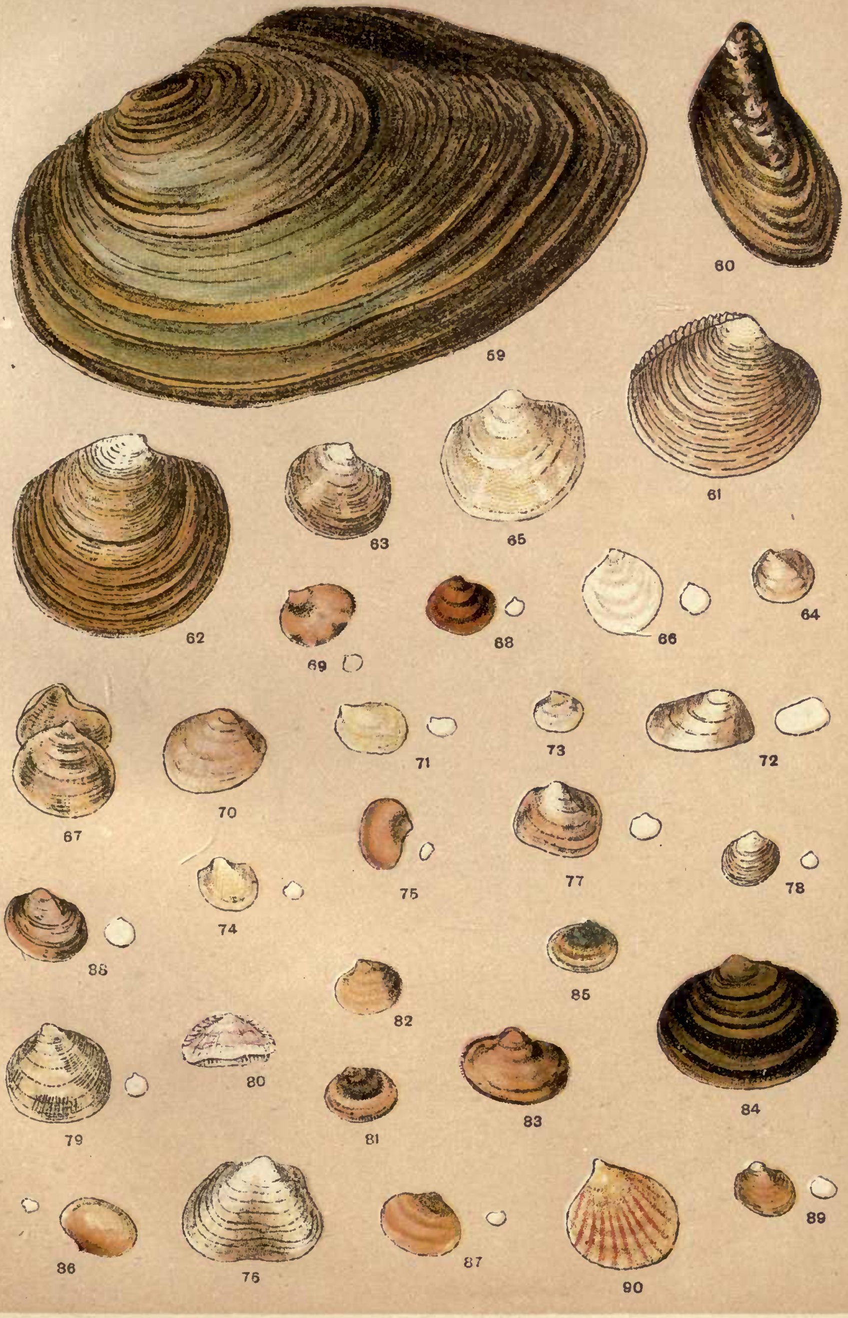
PLATE 7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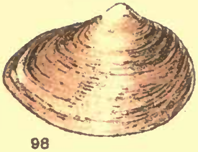
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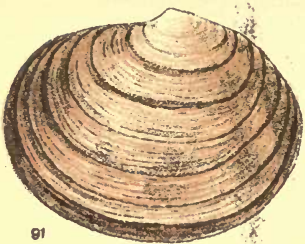
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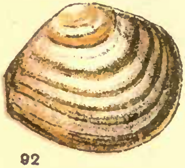
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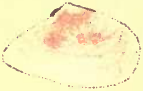
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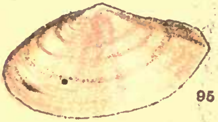
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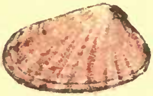
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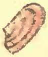
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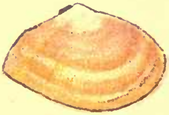
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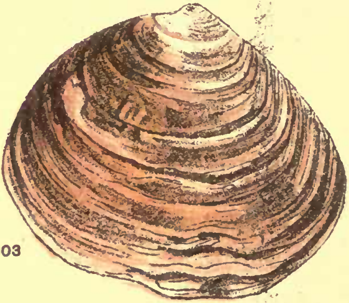
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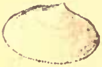
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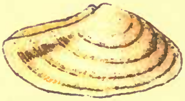
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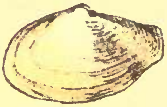
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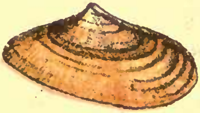
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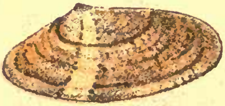
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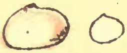
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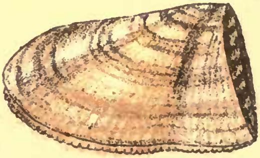
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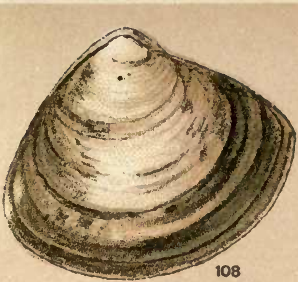
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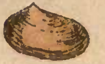
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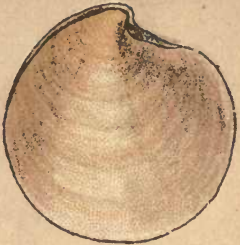
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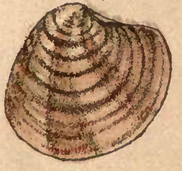
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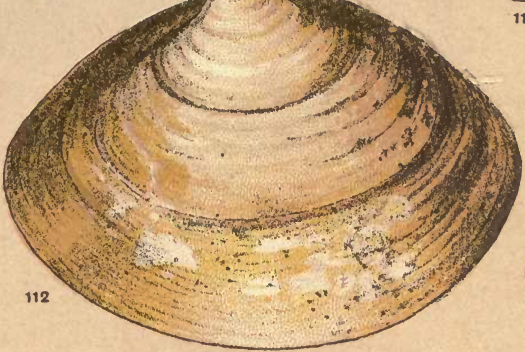
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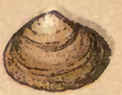
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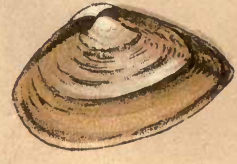
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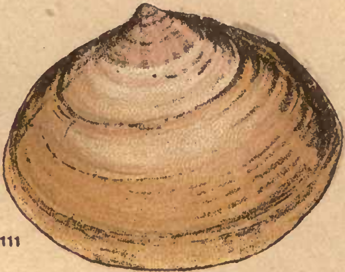
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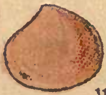
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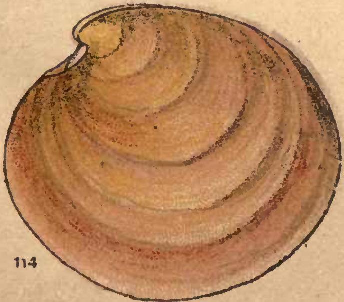
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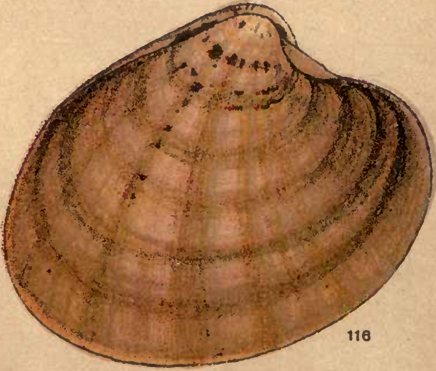
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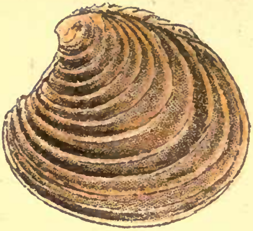
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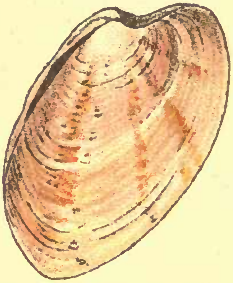
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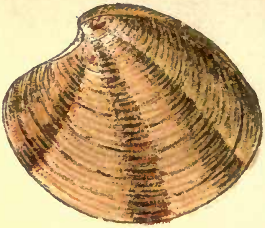
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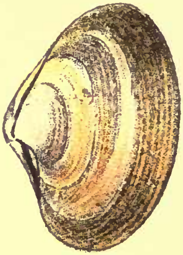
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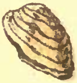
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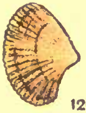
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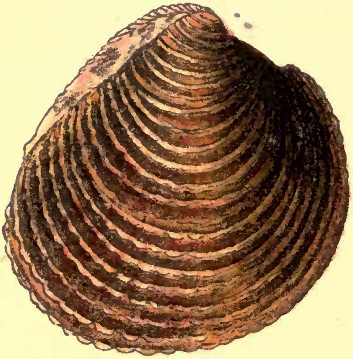
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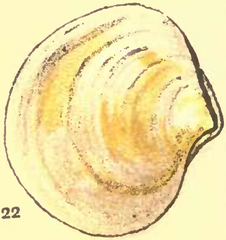
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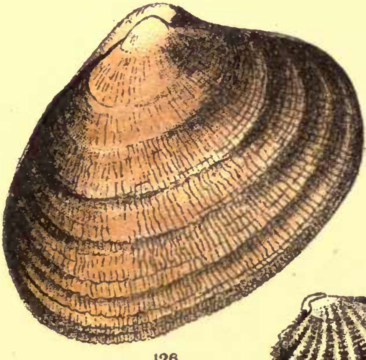
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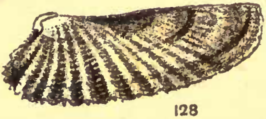
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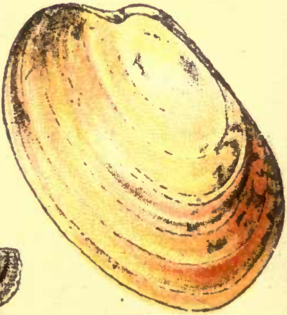
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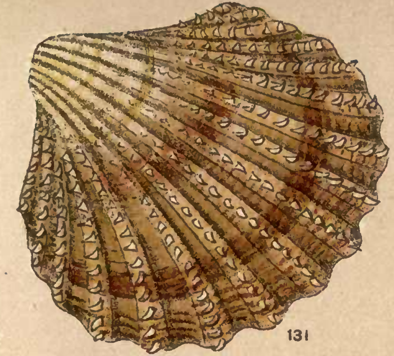
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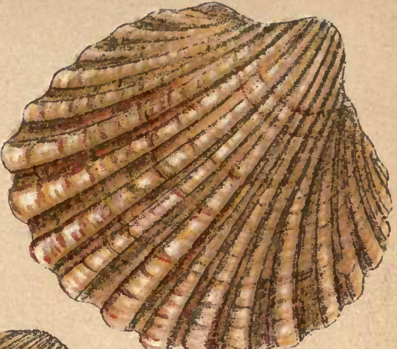
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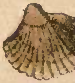
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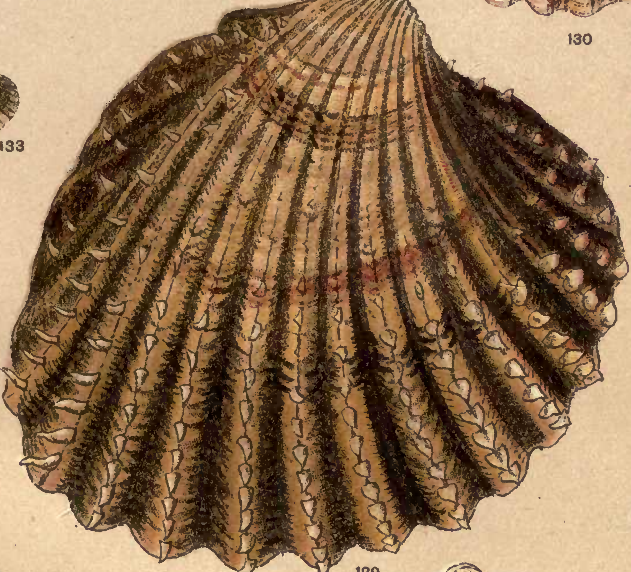
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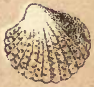
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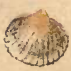
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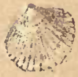
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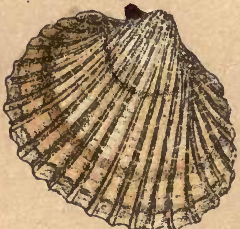
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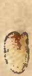
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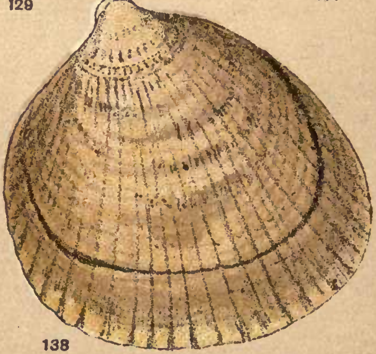
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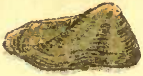

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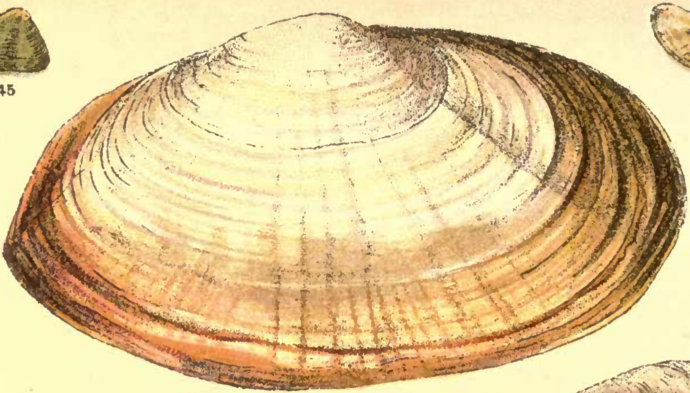

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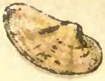

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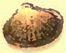

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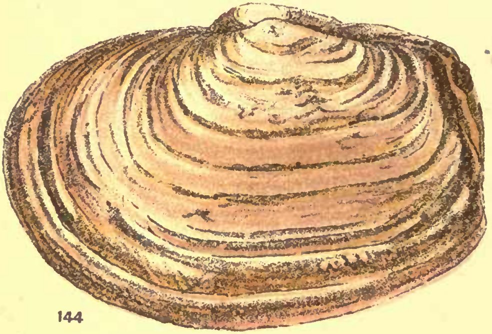

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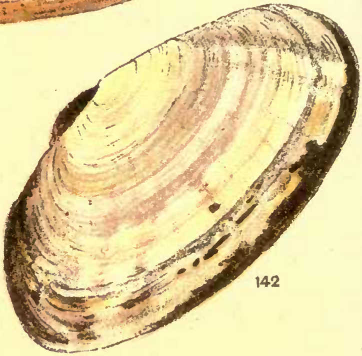

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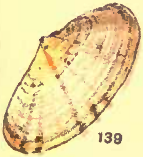

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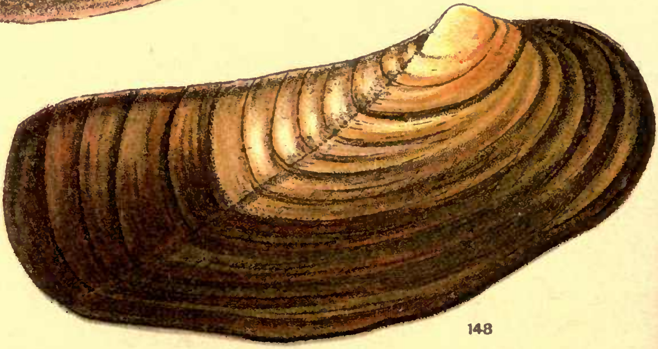

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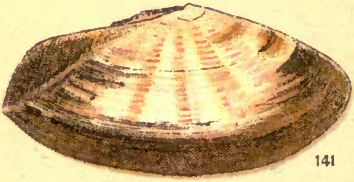

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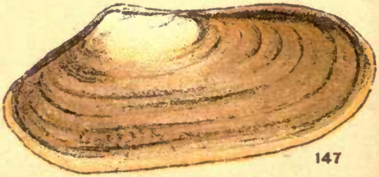

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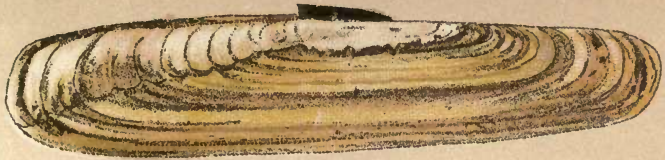
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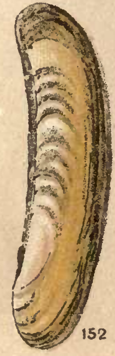
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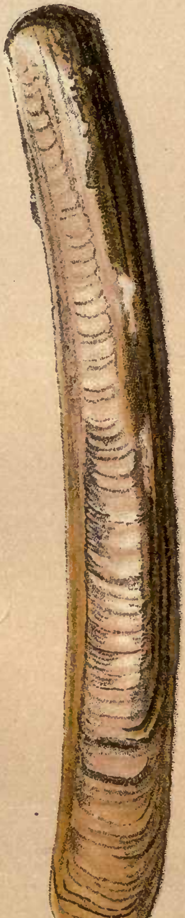
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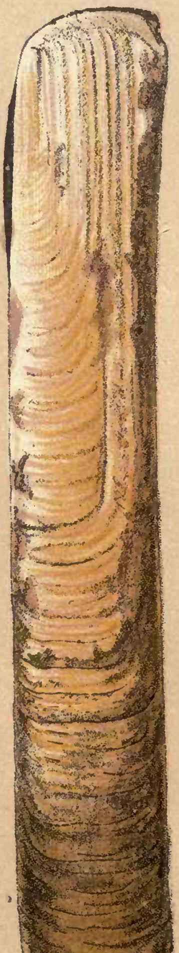
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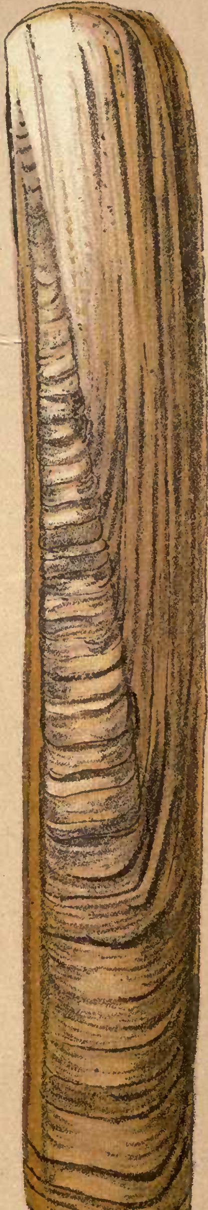
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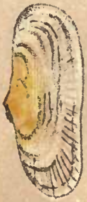
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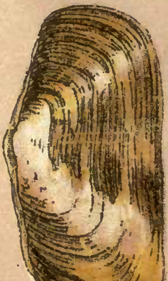
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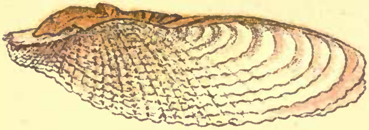
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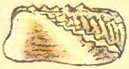
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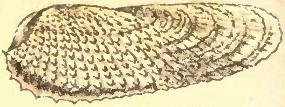
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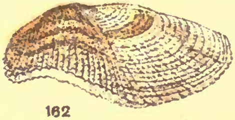
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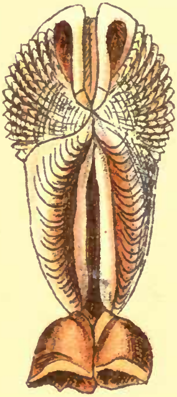
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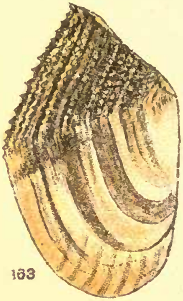
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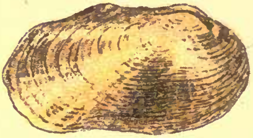
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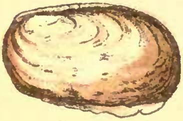
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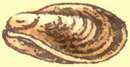
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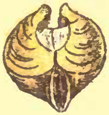
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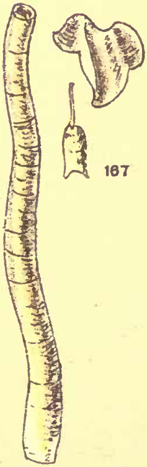
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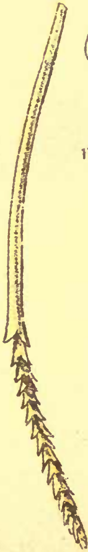

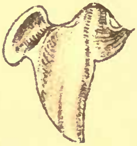
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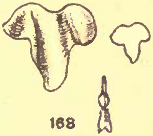
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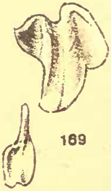
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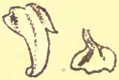
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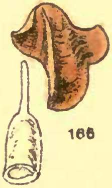
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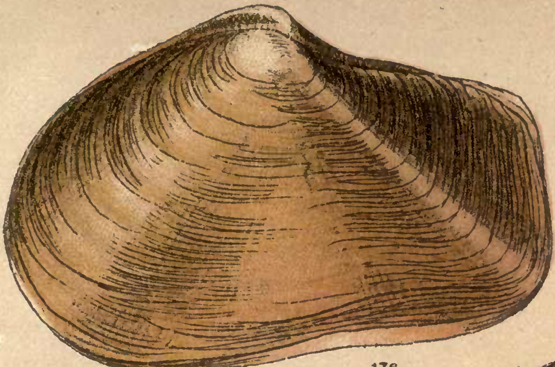
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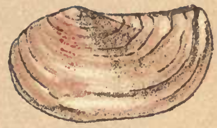
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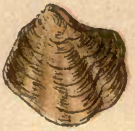
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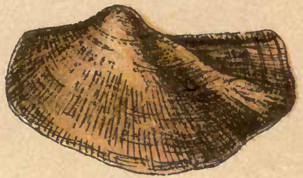
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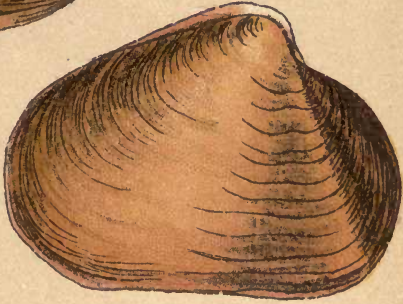
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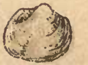
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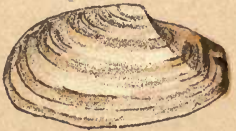
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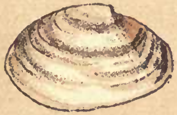
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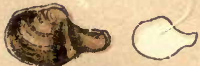
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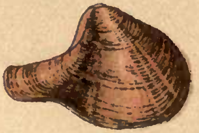
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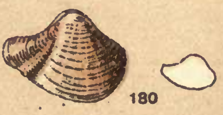
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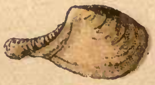
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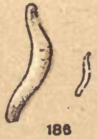
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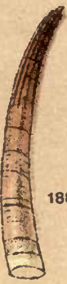
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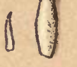
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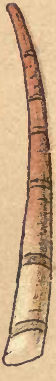
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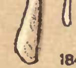
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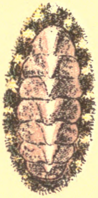
PLATE 16



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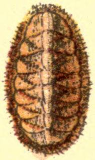

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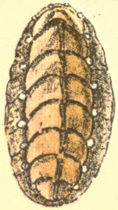

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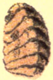

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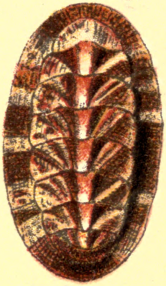

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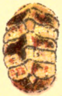

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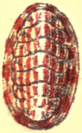

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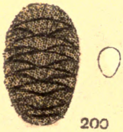

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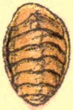

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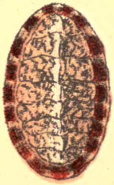

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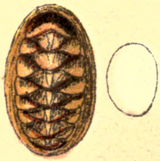

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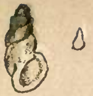
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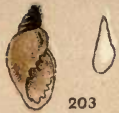
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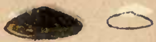
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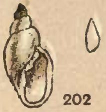
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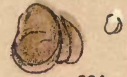
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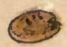
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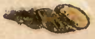
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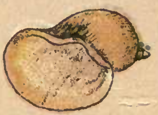
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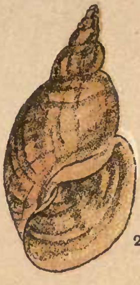
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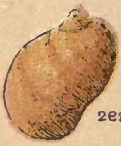
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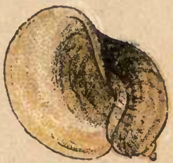
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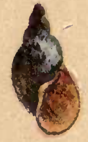
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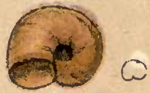
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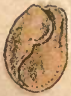
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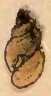
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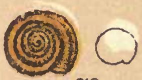
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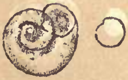
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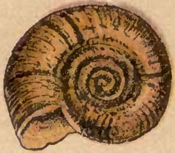
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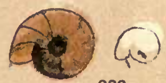
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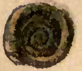
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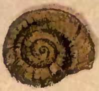
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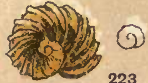
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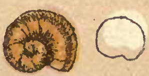
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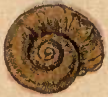
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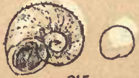
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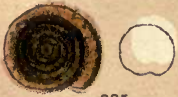
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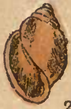
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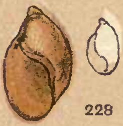
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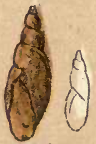
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PLATE 18.

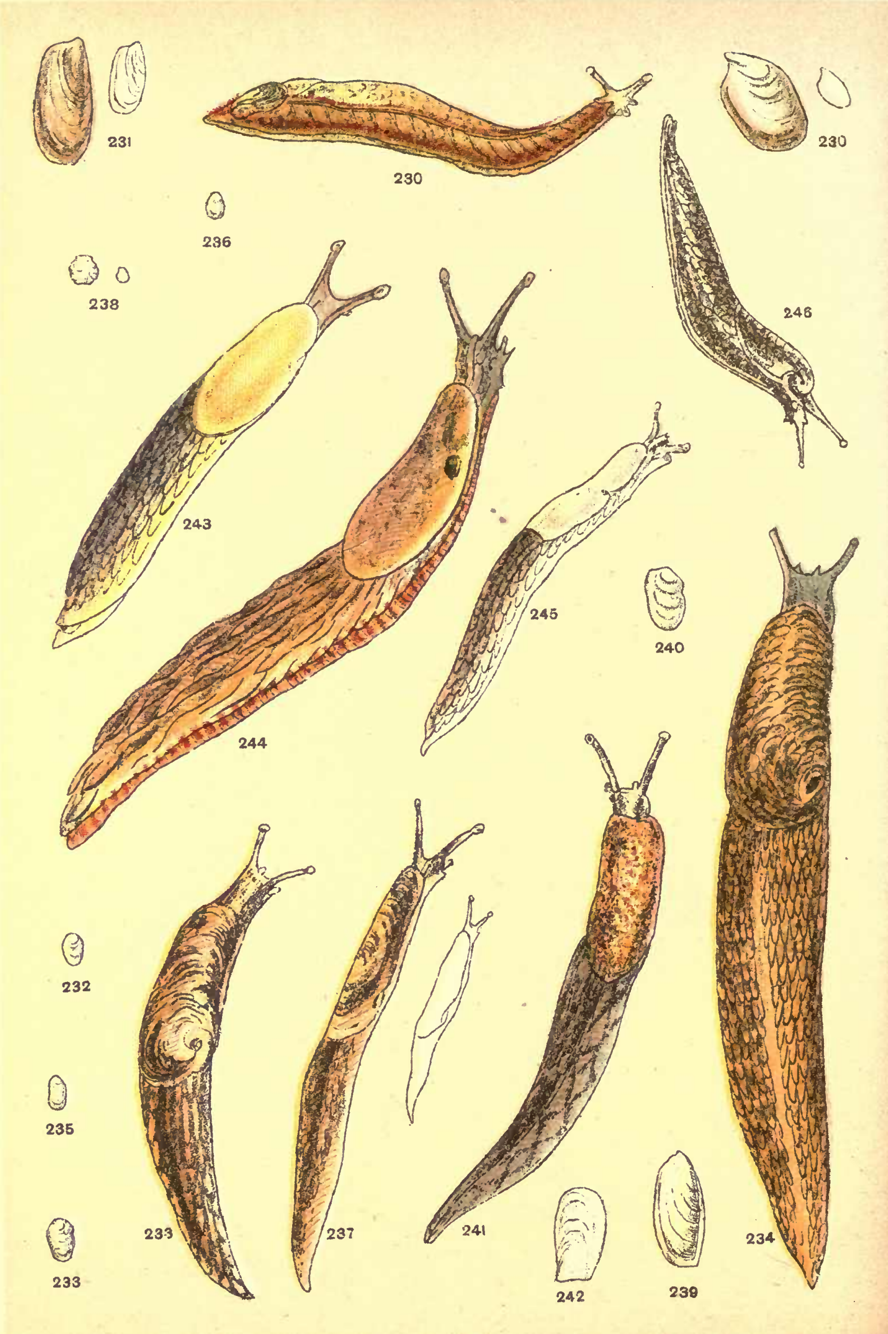
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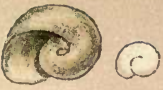
PLATE 19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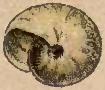
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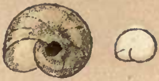
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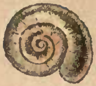
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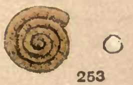
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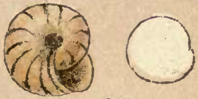
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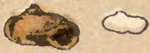
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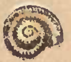
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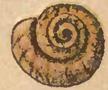
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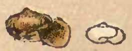
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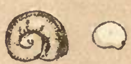
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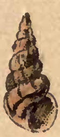
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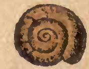
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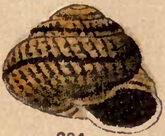
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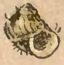
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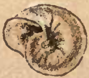
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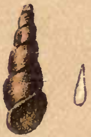
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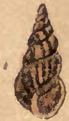
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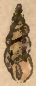
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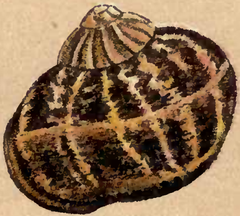
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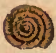
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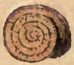
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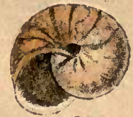
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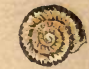
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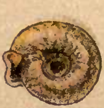
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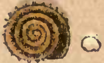
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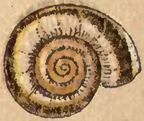
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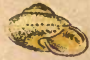
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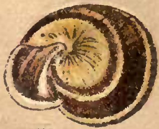
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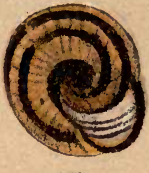
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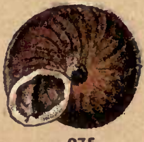
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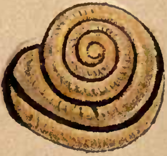
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PLATE 20.

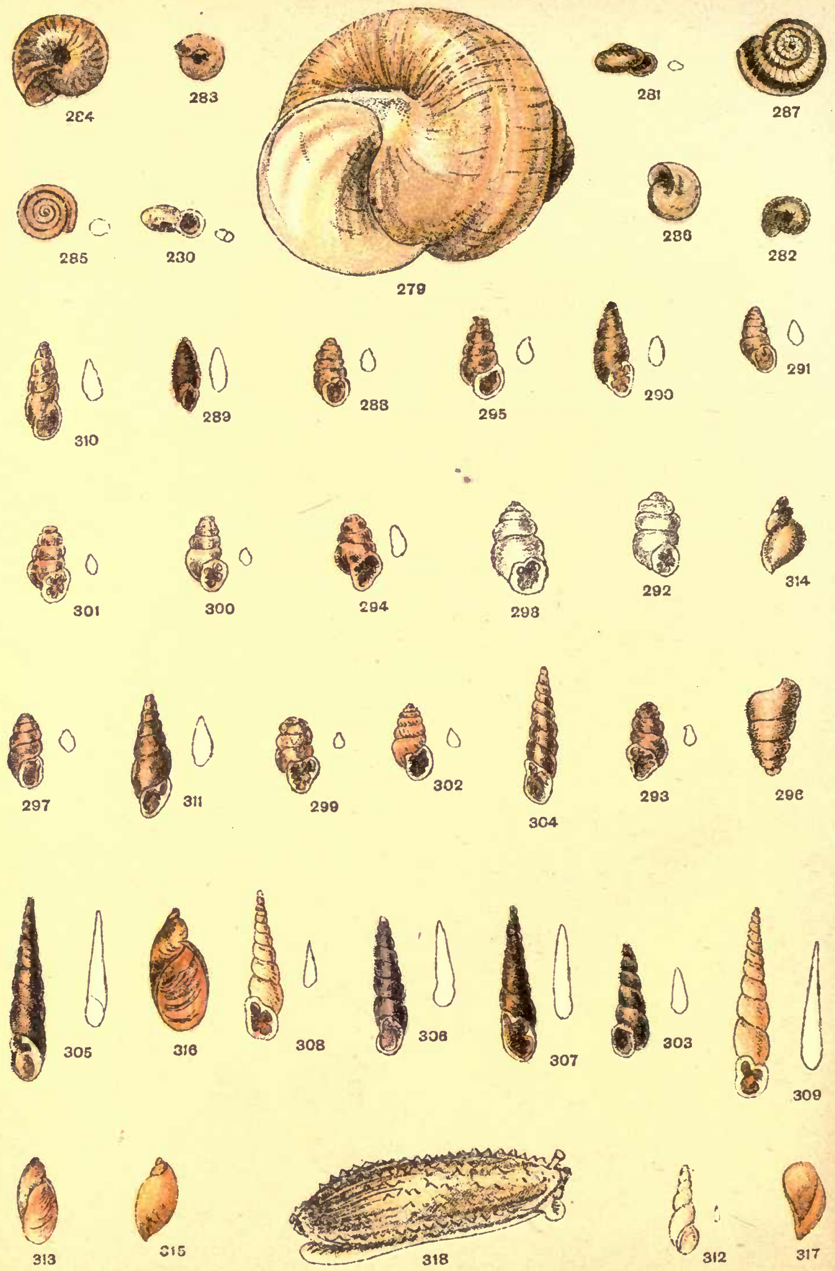
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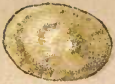
PLATE 21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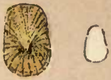
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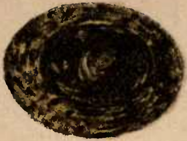
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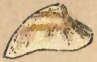
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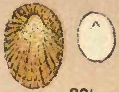
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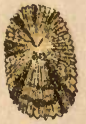
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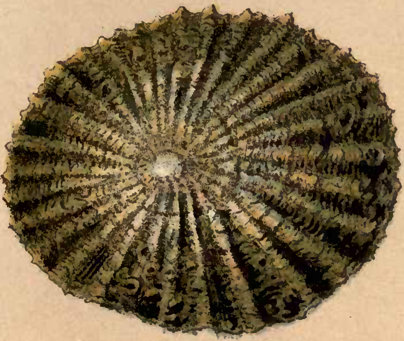
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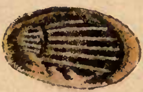
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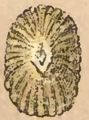
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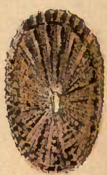
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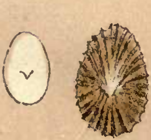
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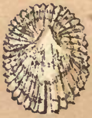
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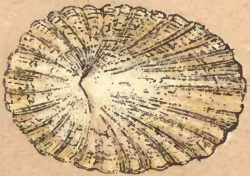
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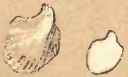
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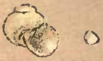
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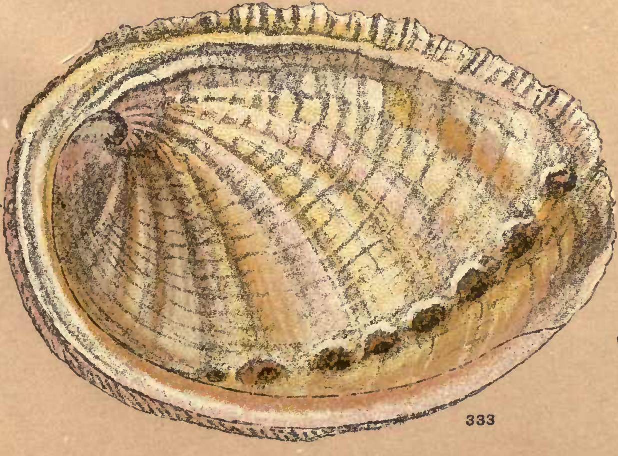
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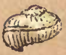
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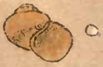
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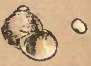
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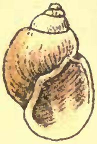
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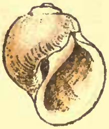
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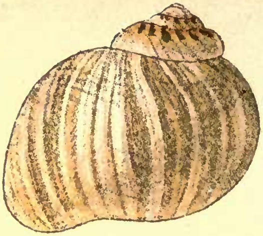
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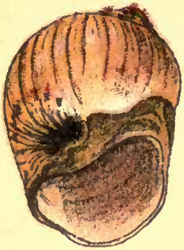
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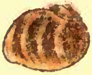
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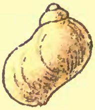
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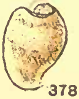
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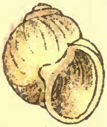
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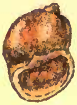
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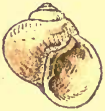
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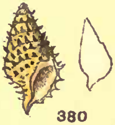
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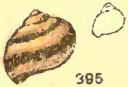
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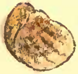
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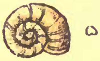
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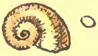
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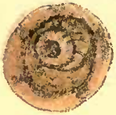
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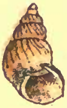
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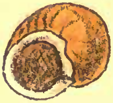
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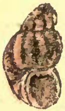
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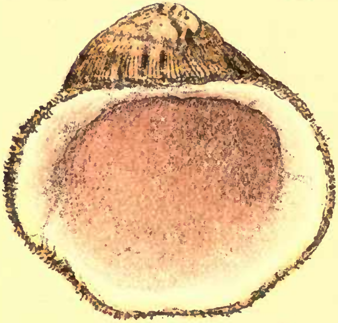
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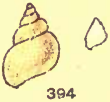
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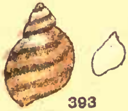
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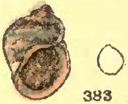
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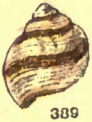
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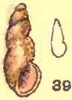
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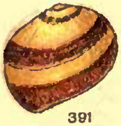
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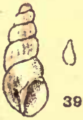
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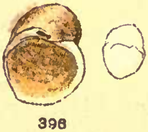
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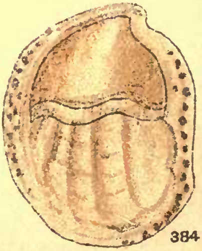
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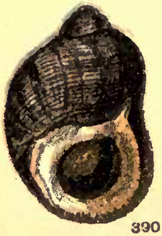
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PLATE 24.

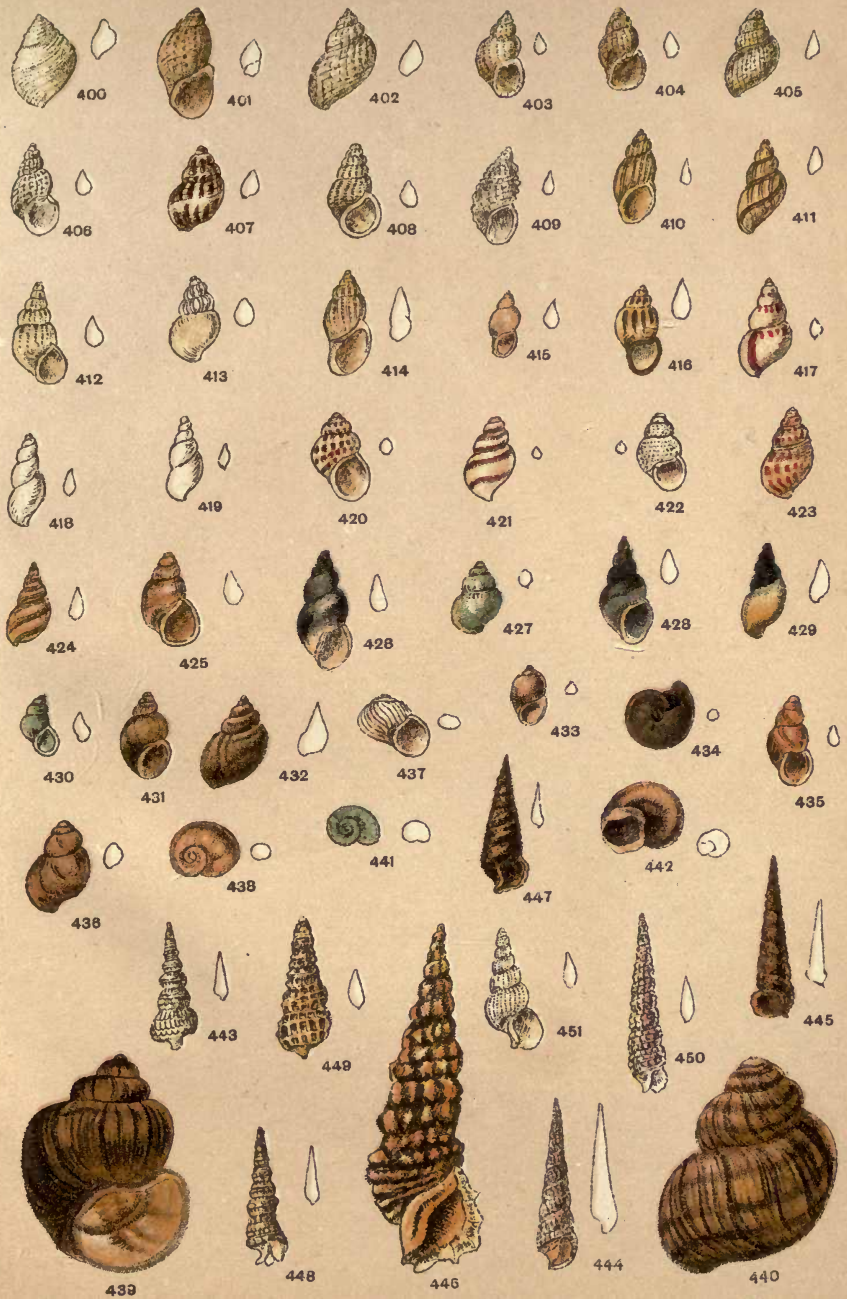
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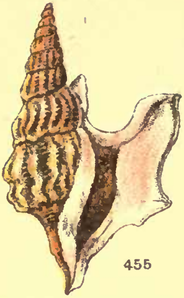
PLATE 25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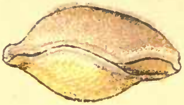
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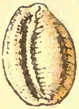
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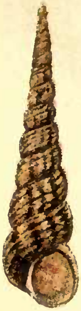
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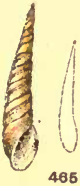
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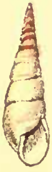
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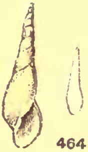
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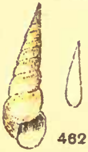
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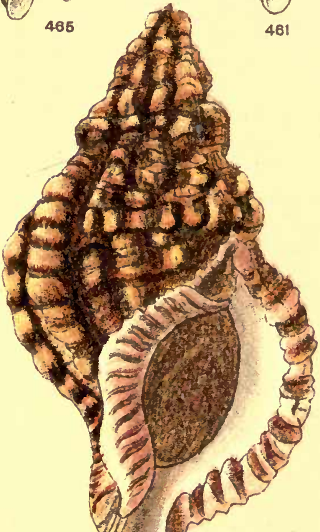
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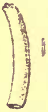
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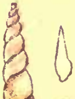
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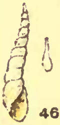
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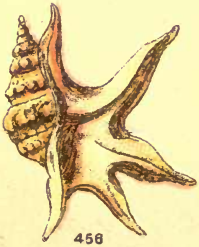
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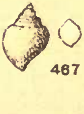
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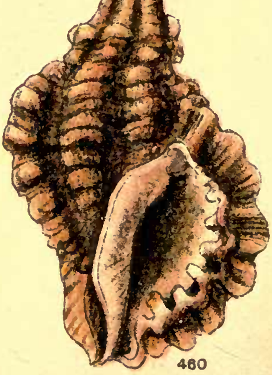
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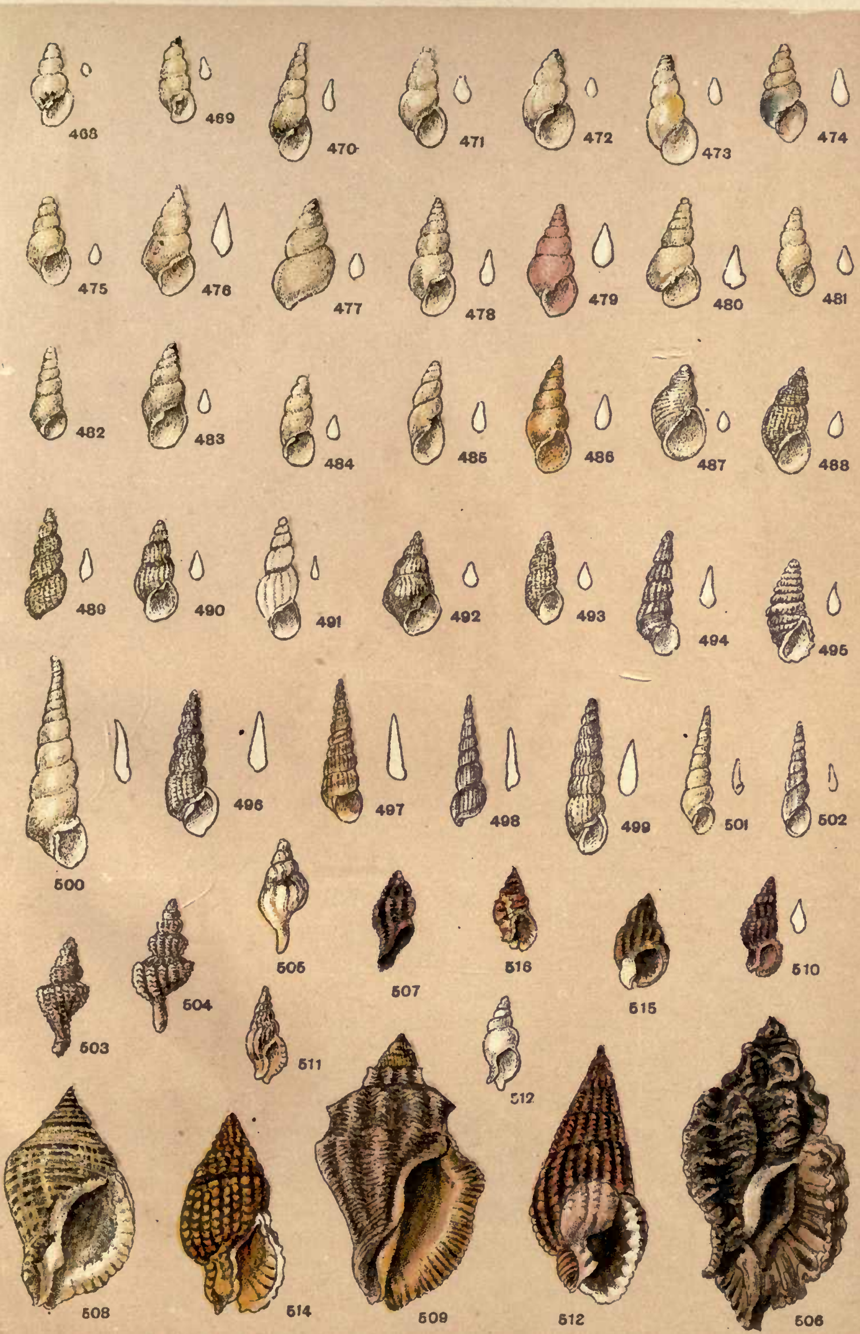
PLATE 26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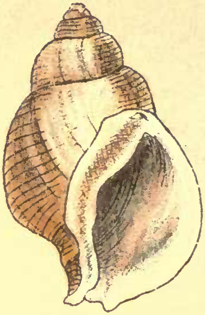

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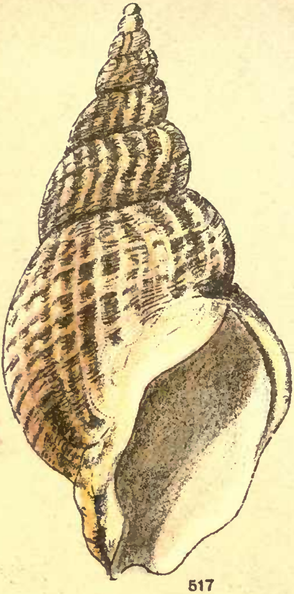

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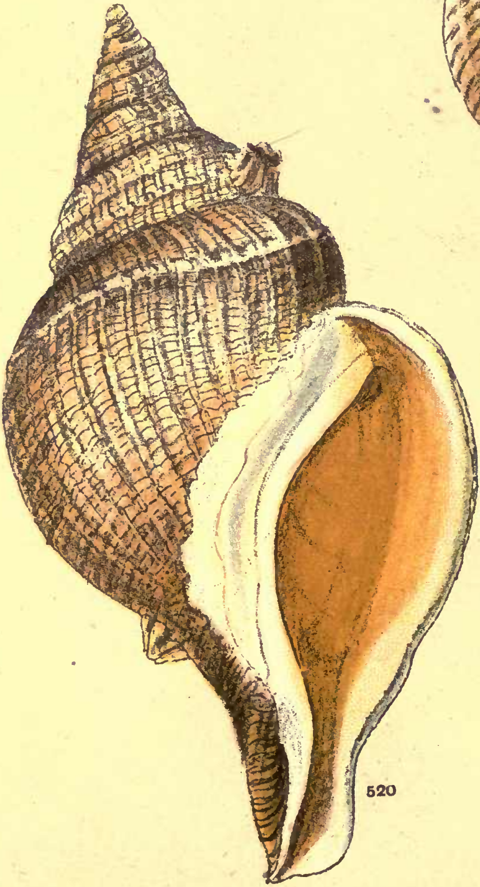

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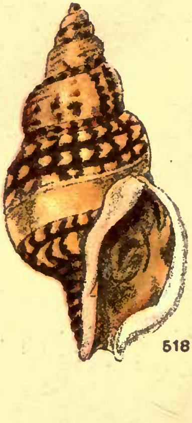

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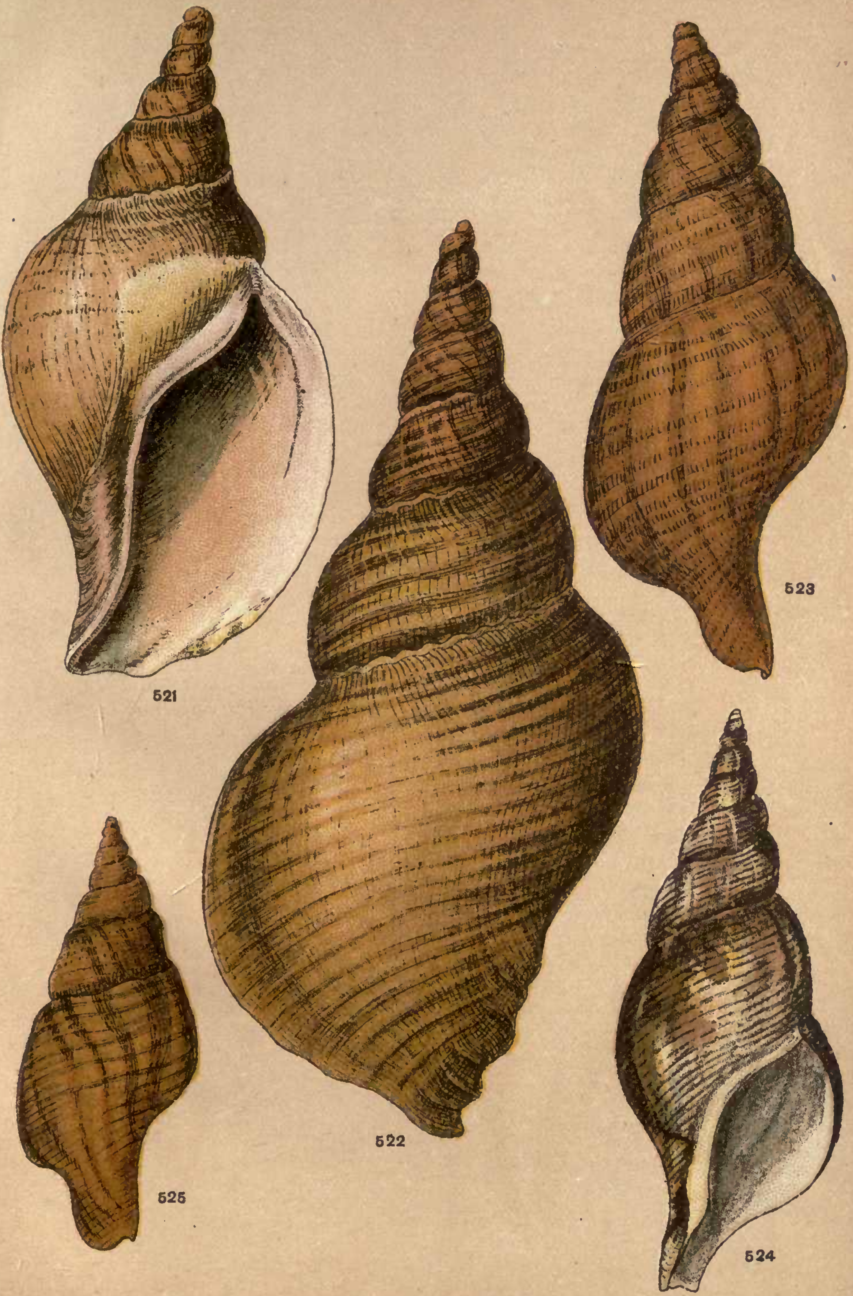
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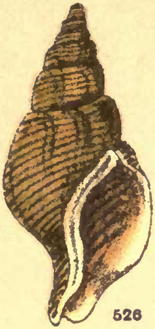
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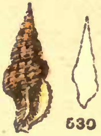
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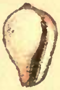
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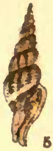
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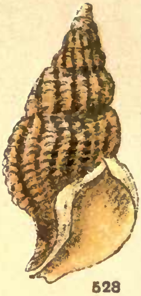
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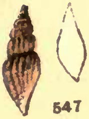
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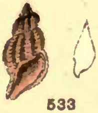
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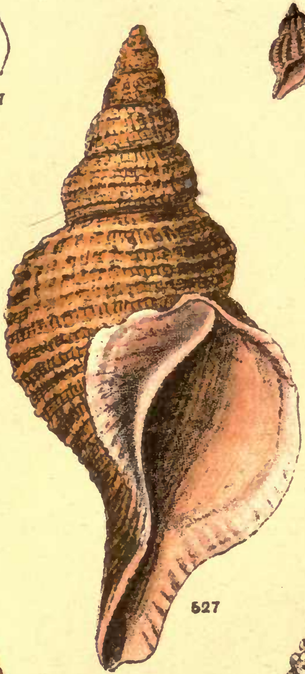
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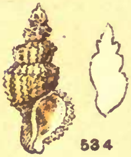
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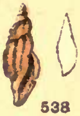
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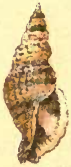
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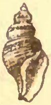
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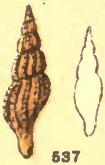
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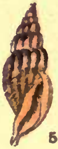
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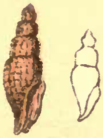
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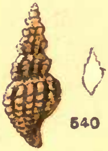
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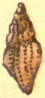
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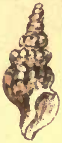
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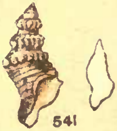
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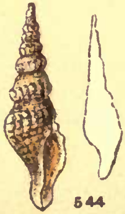
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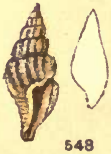
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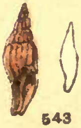
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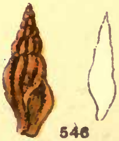
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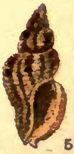
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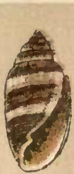
PLATE 30.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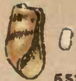
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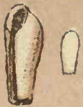
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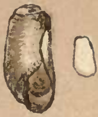
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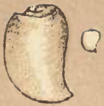
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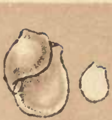
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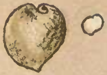
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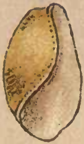
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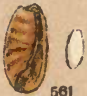
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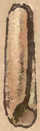
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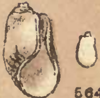
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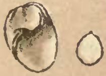
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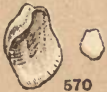
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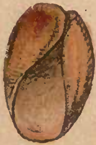
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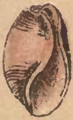
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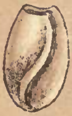
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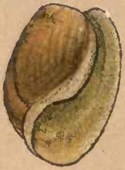
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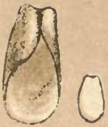
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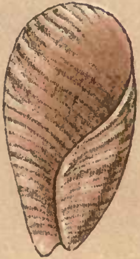
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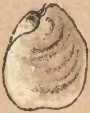
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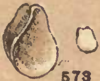
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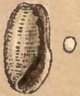
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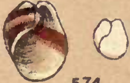
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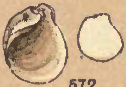
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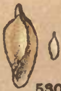
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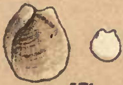
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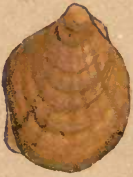
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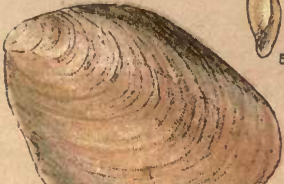
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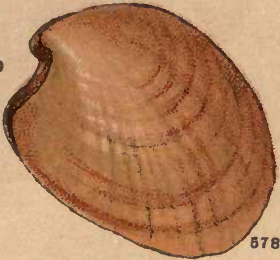
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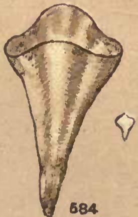
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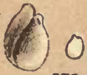
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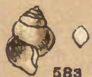
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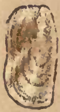
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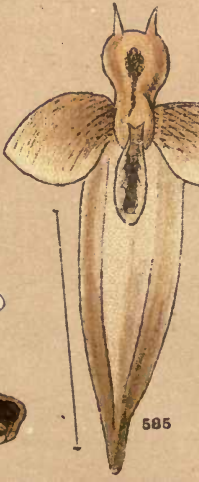
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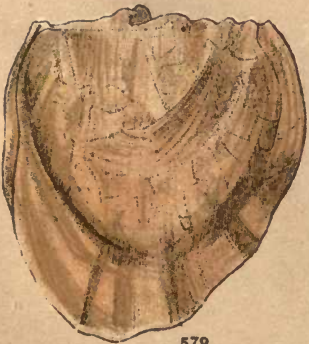
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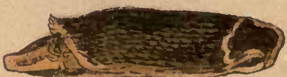
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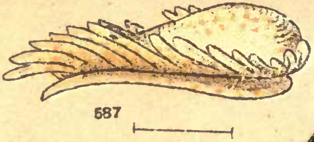
PLATE 31.



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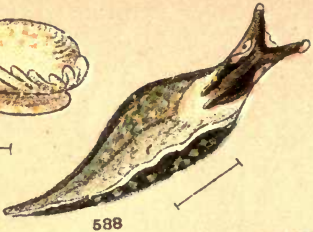

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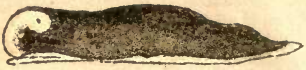

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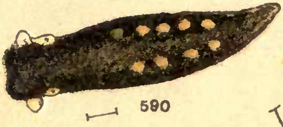

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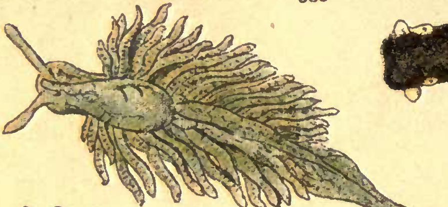

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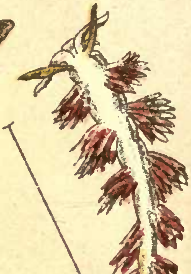

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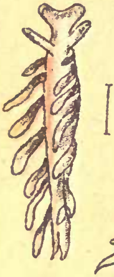

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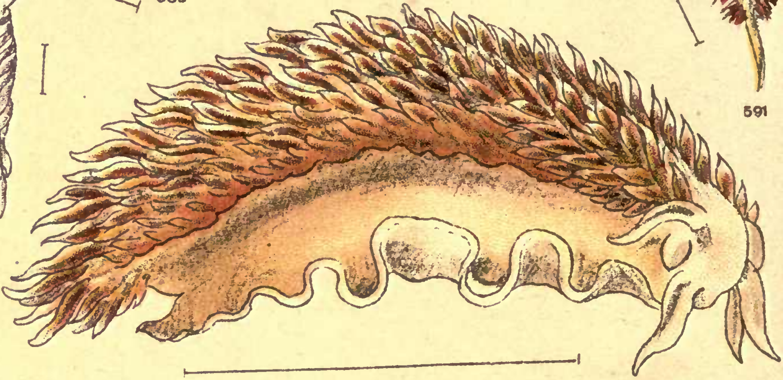

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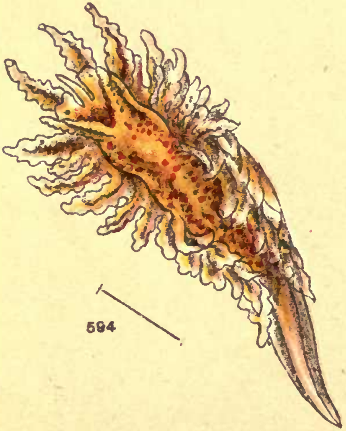

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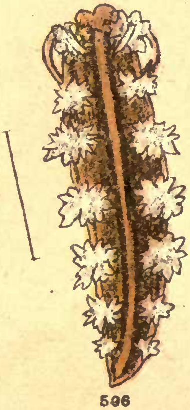

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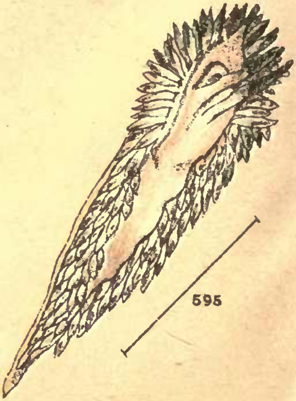

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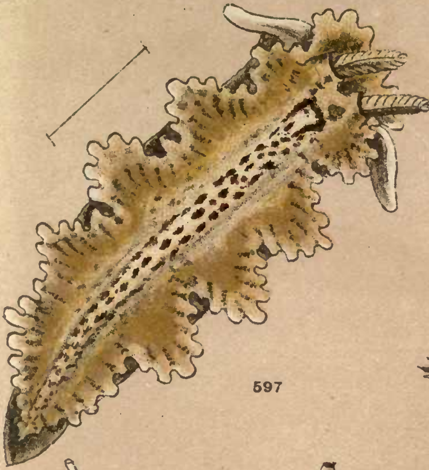
PLATE 32



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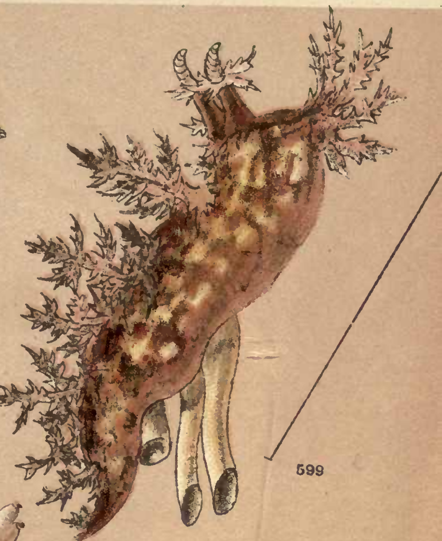

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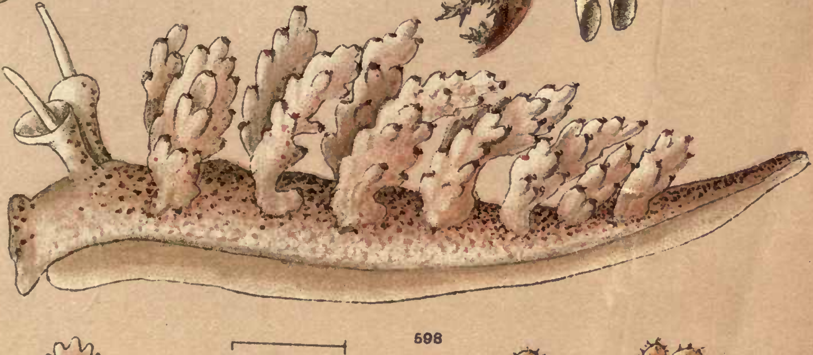

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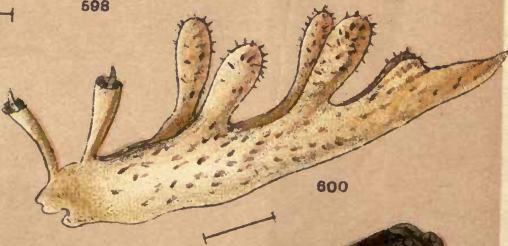

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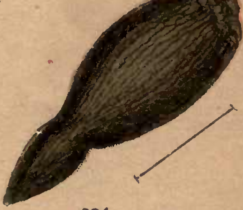

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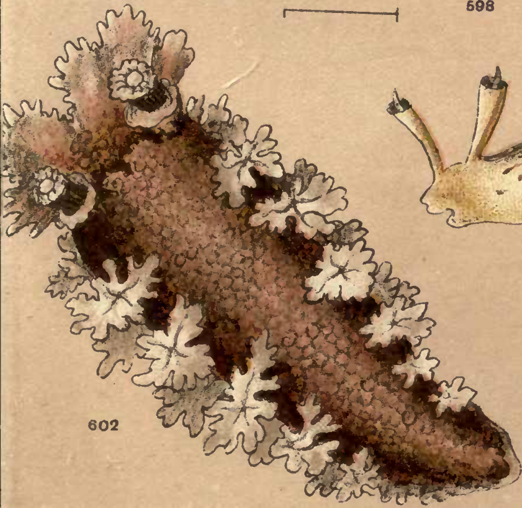
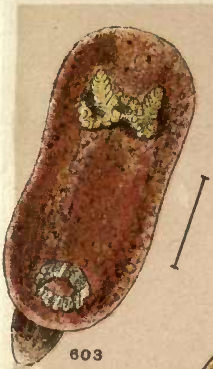


602

PLATE 33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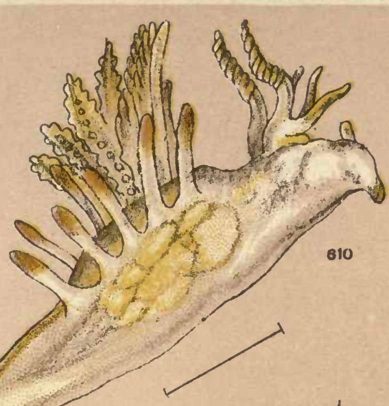
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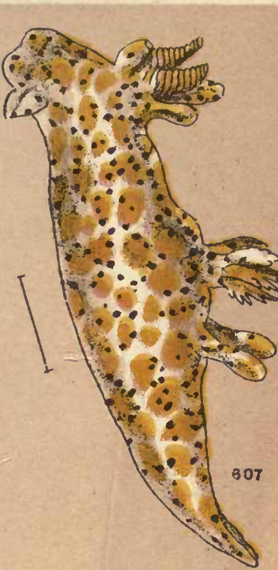
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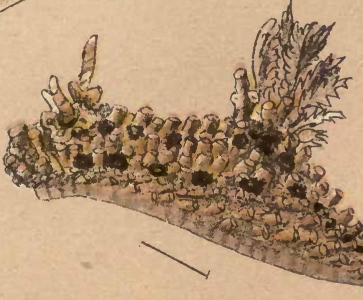
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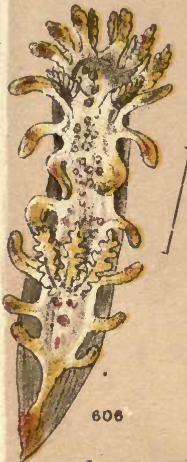
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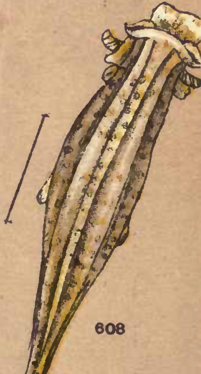
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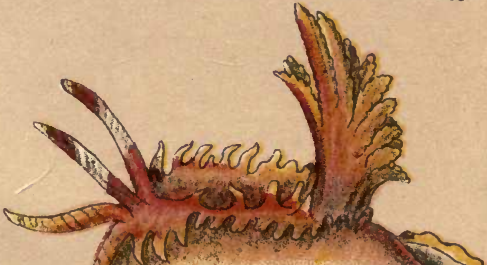
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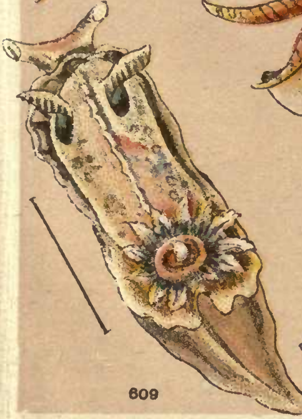
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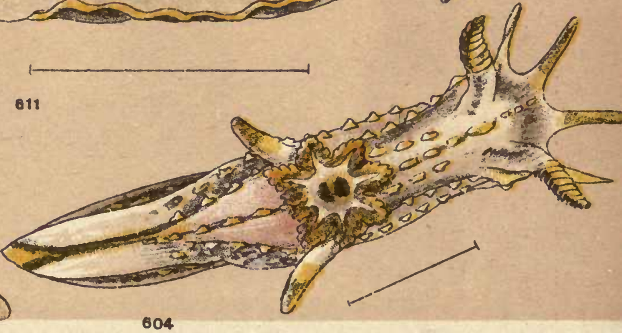
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